AMERICAN FORESTS

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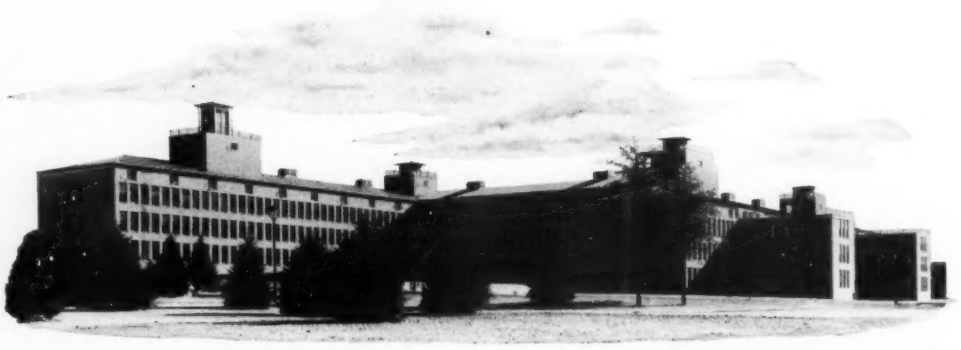

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AMERICAN FORESTS

VOLUME 49 APRIL, 1943 NUMBER 4

Editor
OVID BUTLER

Associate Editors
LILIAN CROMELIN ERLE KAUFFMAN

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American Forests

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The American Forestry Association, founded in 1875, is a citizens' organization for the advancement of intelligent management and use of the country's forests and related resources of soil, water, wildlife and outdoor recreation.

Its educational activities seek to bring about a better appreciation and handling of these resources, whether publicly or privately owned, that they may contribute permanently to the welfare of the nation and its people.

In addition to publication of its magazine—AMERICAN FORESTS—designed to keep before the people of the country important conservation questions and issues, the Association carries on educational work in various fields including forest fire prevention, reforestation, protection of wildlife, prevention of soil erosion, preservation of wilderness areas, establishment of national forests and parks, advancement of forestry by private endeavor, the teaching of conservation in schools and the promotion of research in timber growing and forest utilization.

The Association is independent and non-commercial, and has no connection with any federal or state governments. Its resources and income are devoted to the advancement of conservation in the interests of public welfare, and all citizens are welcomed to membership.

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The Forest Exchange

TVA Conservation Budget

SIR: The omission of the TVA 1944 budget request in the table of federal agencies which appeared on page 88 of the February issue (Conservation in Congress), followed by the Authority's short budget statement which you quoted on page 95, will probably cause some of your readers to infer that the TVA conservation program has been eliminated for the duration.

As a matter of fact, it was unnecessary for the Authority to request any new appropriations from Congress, since our carry-over of unexpended balances, together with our income, was considered adequate to finance all activities in fiscal year 1944. The Authority's work in reforestation for erosion control and in certain investigations has been curtailed under wartime conditions; and the departure of forty per cent of the personnel of the Forestry Relations Department for military service has resulted in a twenty-five per cent reduction in our staff. Naturally, this, together with various economies in operation, has made some reduction in our budget both necessary and desirable. However, we are carrying on with increased emphasis in forest protection, woodland development, and wartime utilization of timber products, and in full utilization of the fishery resources of the Tennessee River system as a wartime source of food.—*Willis M. Baker*, Director, Forestry Relations Department, Tennessee Valley Authority, Norris, Tennessee.

Oldest Tree

SIR: I have been interested in the series of photographs and articles appearing in AMERICAN FORESTS for many months past, about the largest specimens of trees. Several of the trees mentioned in the February issue are personally known to me.

Among them is a Sierra juniper located in the Stanislaus National Forest, California. I am certain this tree is the same as that known as the Bennett Juniper, which I discovered some years ago. If it is the same, your measurements are erroneous. The Bennett Juniper, carefully measured by me, and confirmed with me by Dr. Glock, then associated with the Carnegie Institution, has a circumference five feet above the ground of forty-two feet, nine inches (Circumference as published in February issue was forty feet, eleven inches, from measurements made by F. A. Meyer of the U. S. Forest Service—*Editor*).

The age of this tree is at least 6,000 years. From corings and from many observations taken from similar large trees throughout the High Sierra, and particularly of a large tree destroyed adjacent to this so-called Bennett Juniper, I am led to conclude that this species of tree is the oldest living thing that we know of today in the world.—*C. K. Bennett*, San Francisco, California.

Ancient Buttonwood

SIR: Rhode Island used to have a famous large buttonwood. This tree stood near Newport, and when other trees were cut by the British during the Revolutionary War, this one was spared. However, it would appear from a scar on one side that they had attempted to fell it, but abandoned their design, probably in despair because of its immense size. Writing in 1878, a Rhode Island historian says of the tree:

"The old buttonwood tree . . . was said to be the largest tree on this side of the Alleghany Mountains. It measured about forty-two feet in circumference where it entered the ground, and more than twenty-two feet in the smallest part of the trunk, before it came to where it spread out, some ten feet from the roots, into two forks of nearly equal size. One of these forks I measured as it lay dead, entirely bereft of bark, and found it to be exactly thirty-six inches in diameter, fifty feet from where the tree entered the ground. . . . This tree has been several times described in the public prints. It seems that its memory has been thought worth preserving as a Revolutionary or historic relic, as, a few years ago by a written request of the faculty of the Smithsonian Institution, I forwarded a small block riven from the heart of a huge limb, to be inserted with other relics into a mosaic-made table that it was proposed to exhibit at the Centennial Exhibition. . . .

"The big buttonwood sickened and died with the buttonwood blight, that commenced in 1842, simultaneously with the potato blight." — *Anne C. Allen Holst*, East Greenwich, Rhode Island.

SPECIAL ISSUE

Watch for the May issue of AMERICAN FORESTS, a special number dedicated to the great Douglas fir region of the Pacific Northwest. Fifteen graphic articles, more than seventy story-telling illustrations, and many other interesting features. An issue you cannot afford to miss.

The **TECO** *Ring Connector spreads the load on a timber joint over practically the entire cross-section of the wood . . . brings the full structural strength of lumber into play.*

New Navy Blimp Hangar, 1000 feet long; 153 feet high; clear-span roof 237 feet. Timber treated for fire resistance according to Federal specifications. Trusses prefabricated by Timber Structures, Inc., Portland, Oregon.

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mammoth blimp hangar was made possible by

TECO CONNECTOR ENGINEERING

Two announcements of the widest import to American engineering have just come out of Washington.

The U. S. Navy has announced that a giant blimp hangar, engineered entirely in timber, is nearing completion "somewhere in the continental United States."

The War Production Board has announced that "such a structure could not have been built of wood by ordinary methods without the use of timber connectors . . . The steel ring timber connector, which is used to increase the strength of joints in wood construction, saved more than 400,000 tons of steel for essential war production in 1942." WPB added that 2,050 tons of structural steel will be saved in this hangar alone.

In erecting this vast, multiple-truss assembly, Navy engineers have accomplished a notable achievement in modern timber connector engineering. The hangar is the latest of scores of large Navy, Army, and Maritime Commission projects built with Teco timber connectors under the revolutionary Teco system of timber engineering. It is one of over *100,000* heavy-duty structures, of *over 600* types, built under the Teco connector system in the past few years. They include clear-span factories, bridges and trestles, towers, tanks, warehouses, docks, shipyards, and many others.

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THE EDITOR'S LOG

Presidential Decision

The hotly contested Forest Products Service proposal of the Department of Agriculture to help increase war lumber production was plowed under with Executive sanction on February 28. Its requiem, penned by the President, was a classic in clarity. "I am convinced," he said, "that a simpler and more generally acceptable plan can be devised to give the desired results with much less cost and overhead." And to prove his conviction, the President gave immediate approval to a new proposal drafted by J. Philip Boyd, director of the Lumber and Lumber Products Division, War Production Board.

Whereas it was originally proposed to set up in the Forest Service an organization known as the "Forest Products Service," with extensive powers, and financed with a large revolving fund from the Commodity Credit Corporation, the new plan is designed to attain the same end more directly and economically. In essence, it is advisory, giving formal recognition to a type of service which involves none of the elements so vigorously challenged in the old plan—government competition with industry, for instance, or preferential priorities and markets, or federal regulation of privately owned timberland. It provides simply that the WPB, under a cooperative arrangement with the Forest Service, assist lumber producers "on the ground" through advisory, technical and cooperative channels.

The Executive viewpoint was expressed in a letter by the President to Donald M. Nelson, WPB chairman. He wrote:

"I am in agreement that unusual action is needed to maintain the output of forest products at a high level as an essential aid in the prosecution of the war. However, I am convinced that a simpler and more generally acceptable plan can be devised to give the desired results with much less cost and overhead.

"The main feature of such a plan should be service, especially to small operators, in meeting the many inevitable procedures incident to total war; aid in securing a timber supply for mills not now adequately provided with standing timber; aid in obtaining firm contracts for the output of logs and lumber, thus enabling the operator to secure adequate finances primarily through private sources; and technical guidance to operators to assure efficient use of available manpower and facilities.

"The WPB has the sole legal responsibility for production, and of course must maintain that position. I can assure you, however, of the fullest cooperation of the Forest Service, consistent with limitations of personnel and financial resources, in meeting that responsibility."

The President's approval of the substitute plan was made "subject to the understanding that where federal financial aids are advanced there must be provision to prevent destructive forest practice."

The Plan

Functions of the new plan are summarized as follows:

Advisory Service to Industry—Assist timber operators and owners to secure firm contracts at a fair price for their output; provide advice and information as to specifications and types of production needed to meet war requirements; advise operators in the use of government forms; and aid in the placement of unusual war or essential civilian lumber orders.

Technical Service—Help develop needed logging roads; advise and encourage increased use of so-called inferior and more available species; obtain factual data and information when establishment or modification of ceiling prices is deemed necessary; provide engineering consulting service for logging and milling; and supervise timber harvesting on private estates where cutting without technical supervision is not now permitted.

Cooperative Service—In cooperation with the U. S. Employment Service and the War Manpower Commission, aid in locating and transporting labor for the industry; in cooperation with the War Manpower Commission and the Office of War Information provide information and make patriotic appeals to management and labor to obtain greater production; locate stumpage for existing operations and put operators in touch with owners of merchantable forest products; in cooperation with the Selective Service System help present the draft deferment needs of logging and milling operators before local boards; and help present the needs of logging and milling operators before local ration boards for tires and other rationed articles.

Specific Projects — Full investigation and information of: The suitability of the wood for special purposes; the availability of the raw material supply; the manufacturing facilities available, or needed; and a definite recommendation as to whether the program should be undertaken or not. If undertaken, the Service would have responsibility for making available timber supplies, manufacturing facilities and other implements of a physical nature; also to provide any technical information to industry which is required in production problems. If financial aid is necessary, the Service would decide in agreement with the WPB which form of aid is needed.

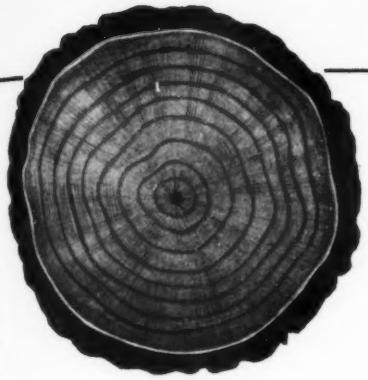
The tragedy of this story is that the need of increasing lumber production was as great last June when the original plan was formulated as it is today but that it took nine months for the government to bring forth even a compromise of sorts. The original plan had its meritorious parts. Its trouble was that its drafters in the Department of Agriculture wrote into it grants of power and money so potentially broad that industry rose up in mighty wrath and would have none of it.

Chance to Pioneer

If you have a practical knowledge of rubber and oil-producing crops and other tropical plants, Uncle Sam needs you—at once. The call is for plant production specialists, and in some cases for foresters, horticulturists, plant breeders and agronomists, to serve in the vital war job of getting rubber and vegetable oils out of South and Central America.

Primarily, it is a job of pioneering, for the need is for men to develop and administer programs in connection with the establishment and operation of research stations and plantations in remote and primitive areas in the American tropics. Salaries range from $2,600 to $8,000 a year, plus overtime and additional compensation for duty outside of the United States.

Before filing application with the United States Civil Service Commission, however, check on your qualifications. They are listed as follows:



"Applicants must have had experience of sufficient length, quality and responsibility to insure a practical knowledge of the production of rubber or oil-producing crops or other tropical plants. Such experience may have been acquired in the production and growing of plantation rubber, or possible new rubber crops, oil-producing plants, or other tropical plants; or may have been gained in research, extension, or closely allied work directly related to the actual growing of these plants.

"In general, at least six months' experience must be shown. Additional experience of increasing responsibility will be required for higher grades, depending upon the duties. For appointments to some positions, applicants are especially desired who have had education with major study in agronomy, horticulture, plant breeding, forestry or other courses related to plant production."

There are no age limits for these appointments—for this chance to pioneer.

Relax Outdoors

Every now and then, from some musty niche in a desk drawer, there is recovered a yellowing paper preserved through the years because it contains something we cherish or desire—a phrase to inspire, or a philosophy to calm. From just such a niche was retrieved recently a few lines uttered twenty years ago on the floor of Congress by that ardent champion of the outdoors, Senator Harry B. Hawes.

Just what the good Senator was propounding on that distant day of peace is not recorded, but some of the things he said might well have been directed to every American now engaged in the bitter struggle for freedom.

In a word, said the Senator, "Relax." Then:

"Our forefathers came with the Bible in one hand and the rifle in the other.

"Some of their descendants have lost the rifle; some the Bible; some both the Bible and the rifle.

"Let us restore the confidence and strength that knowledge of the rifle brings. Let us restore the spiritual strength the Bible gives.

"Let us help to bring back both by the purchase of a piece of the big 'outdoors,' where strong men and spiritual power find the best nourishment.

"When we lose our 'pep,' when good food tastes bad, when friends do not satisfy, when life becomes a bore, when music seems out of tune, when the old dog annoys, when the doctor fails, and the good wife irritates, there is but one remedy for the 'run down,' and it is found in the forests or on the streams in the big 'outdoors.'

"There we go to church and worship God by conversing with the things He made, listening to sermons from rocks and trees, choir music from the birds.

"If you need a fresh start and want to lose the 'run-down' feeling and get back your 'pep,' go fishing.

"It is a notable fact that of the Twelve Apostles selected by Christ, four were fishermen.

"They were natural philosophers who made their living in the big wide open, who knew the stars, the tempest, the sea, the sun, the moon, the winds, and the calm.

"They were prepared for a campaign for men because they had first campaigned with the elements of nature.

"Study of nature had prepared them for a study of men, and their thoughts and teachings were big, like the outdoors whence they came."

Here are words of true wisdom, and from one who knows whereof he speaks. Few men in public life are more at home in forest and field than the former senator from Missouri. And few have contributed more to their welfare. Particularly has he been interested in preserving for others, the generations to follow him, the stately beauty of great trees, the streams where trout and bass play, the lairs of nesting ducks and geese, and the bogs where bull moose feed.

He knows what they do for a man —and for his country.

Post-War CCC

Battles in this war are won, comments the Washington, D. C., *Times-Herald* editorially, "mainly by trained expert specialists—bomber crews working together like watch parts, fighter plane pilots outmaneuvering enemy pilots, tank crews as highly trained as battleship sailors, and so on.

"This being the new complexion of war, and its most probable one for a long time to come, it behooves us to cast our post-war defense plans accordingly. We should arrange somehow to get all the experts we need to make and keep this country impregnable—and to keep the experts supplied with all the equipment they will need.

"It looks to us as if the best way to do that would be as follows: A universal compulsory military training law should require all men between say, eighteen and twenty-one, to do a year's hitch in service. This year might be divided into six months' military or naval training and six months in a revived and improved CCC. (To revive the CCC right after the war would be one way to attack the problem of the millions of men who will be walking around looking for jobs.)

"From this large pool of trainees, the most promising and warrior-minded young men should be picked for further training as non-coms. The best of these could go on to an enlarged officer training school system built on the present West Point and Annapolis foundations, with adequate United States Air Force officer training facilities added. Our most promising young officers could then, as now, go on to graduate schools to fit themselves for promotion to the higher ranks."

Very little imagination is needed to picture, on this basis, a future CCC fire crew rolling up some smoking mountainside in tanks, employing heavy artillery to blast out burning snags, and shooting down wind-driven flaming embers with rapid machine gun fire from some low swooping plane. It might work at that.

Ovid Butler

FOREST CONDITIONS AS AFFECTED BY THE WAR

THE progressive shift of American life to an economy of war is bringing into sharp relief the magnitude of the task which lies ahead of bringing the nation back to an economy of peace when the war is won and reconstruction is at hand.

Leaders in both industrial and public fields more and more are seeing this task as one involving problems as great and as vital as those with which the nation is confronted in achieving military victory. They are stressing the need of advance preparations in all ways possible that will not impair the war effort.

One of the key problems in post-war transition to an economy of peace is that of providing employment for ten to twelve million men who will be in the armed forces and twenty to thirty million civilians who will be engaged in war work at the close of the war. Success in dealing with this problem rests in large measure on national ability to act without protracted delays and with dependable knowledge of changes which the war will have wrought in our economic and social resources.

If American principles of enterprise are to be maintained in solving the war-to-peace problems, ways must be prepared for the development of high levels of employment following the war. First and foremost, this calls for agricultural and industrial productivity on a scale probably hitherto unreached. The laying of a course to this peacetime achievement, if it is to be soundly based, must give recognition to the fact that the foundation of agricultural productivity is tillable land and that the foundation of industrial productivity is raw materials.

The main sources of raw materials are the country's natural resources. A determination of the condition and extent of these resources after the drain of a global war upon them is therefore an essential preliminary to the building of a peace, the four corners of which must rest on raw materials, private enterprise, full employment, and sound public policies.

Against this background the project here proposed is concerned with one of the nation's great natural resources—the forest. Because of the universal and diversified need of its products in agriculture and industry, and because of the indirect influence of growing forests in protecting the nation's soils and water supplies, and in maintaining the productive vigor of its people, the forests stand first in importance among natural resources essential to sustained prosperity and general welfare. And their renewability gives them added importance in the building of the country's future.

The present war is having a profound influence upon forest conditions throughout the world. Evidence of its effect within the United States is discernible in current war strains upon our wood supplies and in post-war world needs for wood which are building up as a result of prolonged over-cutting and destruction of forests in all the principal countries of Europe.

In view of these two sets of conditions, a critical and impartial appraisal of the forest situation, with particular reference to its changing status under war conditions, is being undertaken by The American Forestry Association. The project, set up for three years, was formally adopted by its Board of Directors, meeting in Washington on November 19.

This vitally needed study, now taking definite form, is fully set forth here — its background, its purpose, and its method of operation. — *Editor.*

Purpose of the Study

The present war is having a profound influence upon forest conditions throughout the world. Evidences of its effect within the United States are discernible in current war strains upon our wood supplies and in post-war world needs for wood which are building up as a result of prolonged over-cutting and destruction of forests in all the principal countries of Europe.

As the war proceeds these two sets of conditions are emphasizing with increasing sharpness the need of developing the facts (a) as to the effects of the war on the forests of the United States, (b) as to the condition of our forest resources in relation to peacetime reconstruction, and (c) as to post-war problems involved in maintaining forest productivity on the timber growing lands of the nation.

This project proposes to direct itself to those over-all questions in order that the American people may be factually informed in language all can understand and may thereby be prepared to deal intelligently and promptly with forest problems when hostilities cease. It proposes to do this:

(1) By initiating and maintaining a critical and impartial appraisal of the forest situation with particular reference to its changing status under war conditions.

(2) By keeping the public informed of its findings and of its analysis of major aspects of the forest situation from the standpoint of post-war conditions and needs.

(3) By aiding state, federal and private forest agencies to develop and coordinate their activities along lines which the study indicates will contribute most directly to making forests, forest products, and forest lands contribute to the greatest extent possible to the economic and social welfare of the nation.

Need for the Study

The forest lands of the United States embrace one-third of the country's land area and are the source of its most widely serviceable natural resource. They affect vitally every phase of American life from the individual farm and rural community to the large industrial city. Maintenance of the productivity of these lands whether for crops of timber, soil and water protection, or for esthetic, recreational, and scientific use is therefore a major and inescapable factor in the economy of the nation. In post-war reconstruction they should be so recognized by the people and dealt

with on the basis of factually determined conditions as they exist locally and nationally.

It is well recognized that at the present time neither the American public nor American industry is factually equipped to pass judgment on the many far-reaching questions which will have to be considered in formulating public and private policies in respect to forest lands and wood supplies when the war is over. Probably at no time in the history of American forestry has there been more confusion as to the forest situation, due primarily to the fact that the undetermined effects of the war are challenging and will increasingly challenge the reliability of present information as applied to current and post-war forest conditions. The result is an incomplete and highly confused background of pre-war information which precludes the development of sharply informed public opinion and obscures the relative importance of many basic questions. A few examples will illustrate:

Is the insistent demand for forest products for war purposes leading to methods of cutting that threaten the future productivity of the forest; if so, where and to what extent?

Are our reserves of merchantable timber being seriously depleted? What is the relation between current drain on the forest resource and its growth? Are present drains and practices jeopardizing our ability to meet our own post-war needs for wood and at the same time to supply other countries with wood for post-war reconstruction?

What are the potentialities of chemical and technological developments in the utilization of wood that are coming out of the war, and what kinds, sizes and quantities of trees will be required to develop these industries on a peace-time basis? To what extent may new methods of wood utilization revolutionize present conceptions of forest management?

Will war operations leave the forest in such condition as to increase greatly the danger of conflagrations, of insect epidemics, and of loss from disease?

What is the relative effectiveness of forest management by private owners and by public agencies, from the standpoint both of results and costs?

What basic factors are preventing the practice of cropping methods of forest management by farmers and other small owners who in the aggregate own almost half of the private forest lands in the country?

What effect will war and post-war needs have on the relative demand for such diverse forest products and services as wood, wildlife, recreation, prevention of erosion, and regulation of streamflow? What kinds of "multiple use" of forest lands will be desirable, and how can they be brought about?

Clearly the most accurate and unbiased information that can be obtained on such questions as these is essential for intelligent action by private enterprise and by state and federal governments in deciding policies and lines of action that should be adopted with respect to long-range management of the forest resource as a sustaining element of American life.

The American Forestry Association

The American Forestry Association—an independent, non-profit, and non-governmental organization — was the first national organization in the United States to essay the task of creating and organizing public interest in support of the wise use of our forest and related resources. From its beginnings in 1875, and without lapse of effort, the Association has held to its course of educational and action leadership, seeking always to bring about public and private stewardship of natural resources that would yield the greatest human benefits. It has been an unprejudiced and impartial leader in the formulation and establishment of constructive federal, state and private forest policies.

In its proposal to undertake the study project which is outlined in these pages, the Association is moved by its deep conviction that the charting of a post-war forest course cannot be intelligently accomplished unless preceded by a critical and impartial determination of forest conditions as they are being altered by the war and as they will confront the nation at the war's end.

Therefore, by formal vote of its Directors, and with a keen sense of its responsible duty to America in these grave days, The American Forestry Association has resolved to undertake a study which will produce these results. In order to do so authoritatively and within the time allowable, the Association needs the cooperative participation and financial support of all organizations, groups and individuals who share its belief. It, therefore, seeks this support. It cannot predict what the findings of the study will show but it does know they will provide the factual basis for the formulation of, and embarkation upon, forest policies that will be right for the future of the country.

Method of Operation

The project will be carried out by experienced and competent foresters assigned to different forest sections of the country as follows: (1) South, (2) East, (3) Central, and (4) West. These men will devote their time to a determination of conditions in their respective regions by (a) studying the effects of the war on the forest resource; (b) assembling and analyzing information available from local and national sources, such as state and federal forest agencies, extension and industrial foresters, agricultural and forest experiment stations, etc.; (c) cooperating with local agencies in studying special situations and problems, and (d) preparing periodic summaries of their findings regarding the general forest situation within their respective regions.

These men will work under a Director to be centrally located, whose duty will be (a) to coordinate the programs of study; (b) check the competency of work being done; (c) assemble the regional findings into reports on forest conditions for the nation as a whole, (d) interpret trends in forest utilization as they bear upon future practices and policies of forest management, and (e) organize and direct programs whereby both regional and national findings are conveyed to the public through newspaper, radio, magazine, and other publicity media. Both the Director and the regional men will have at their disposal a great amount of local cooperation on the part of the many people and agencies interested in having developed a factual post-war picture of state, regional and national forest conditions.

Budget

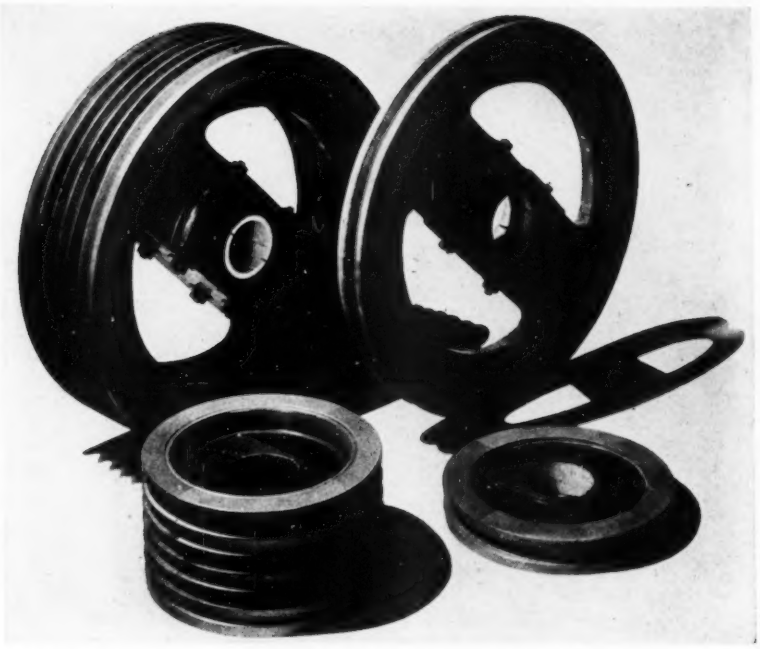
The project is planned for a three year period with extension if conditions demand. Its yearly cost is placed at $50,000, or $150,000 for the three year period. This sum must be provided through a special fund. The Association is convinced that the project promises to contribute so substantially to the perpetuation and wise use of one of the most indispensable of the nation's natural resources that it will command the financial participation of interested individuals, organizations, and institutions.

All funds subscribed for the project will be used exclusively for the work as outlined above. Under the Federal Revenue Act, monies subscribed by organizations or individuals in support of the work are deductible for the year in which they are paid.

The Association believes it urgent that the work be started as early as possible. It, therefore, proposes to initiate the project when but not before funds have been assured to carry the work through the first year. A starting minimum of $50,000 has therefore been designated by the Association's Board of Directors. In the event this minimum is not raised within a reasonable period all funds subscribed and paid will be refunded.

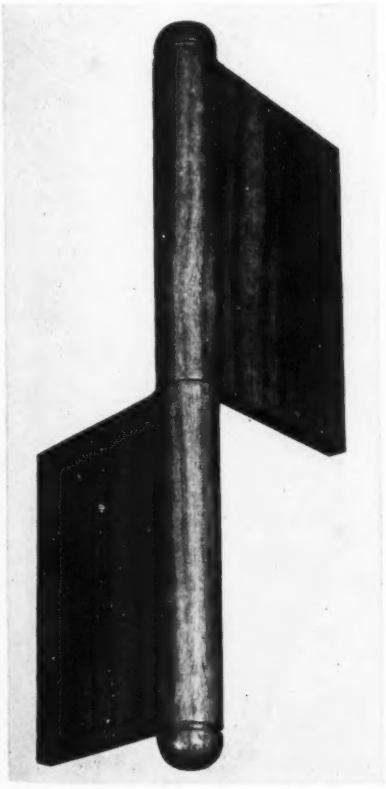
WOOD and MACHINES

By ELRICK B DAVIS



Machine-tooled mass production started with wood pulley blocks

THE "Miracle of Detroit" is having its origins recalled and its history retraced in the wood-turning plants of America's forest products regions.



Hinges are one of many former metal items now made of wood

From the old toothpick factories of Maine to the mass-production box mills of the western pine country, and from Grand Rapids to the Gulf, machine tools are precision-fabricating lumber with as nonchalant accuracy and dizzying speed as their opposite numbers are working steel in the war-converted automotive industry.

Veteran war correspondents representing the press of all the United Nations have been permitted by our war services periodically to visit this country's munitions factories during the last two years. Purpose has been to let them see for themselves what American industrial practices are doing in the war of supplies, and to compare the performance of the "Arsenal of Democracy" with what they saw during Goebbels-conducted tours of selected "high-speed" German munitions plants before Pearl Harbor launched the United States into war with the Axis and ousted our reporters from the Reich.

To boil their comparison down to headline size these trained observers called their findings "the miracle of Detroit," but all American mass production was what they meant. Curiously none of these tours included the wood-turning industries.

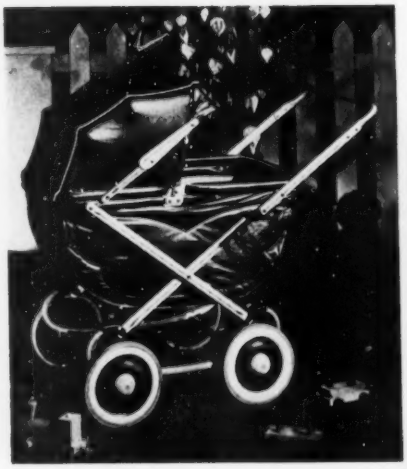
Curiously, because mass production means exactly duplicate items and interchangeable parts; and that means fabrication of materials with machine tools; and all that began with wood and an idea hatched at Alexander Hamilton's dinner table one evening four generations ago and proved in practice to meet a critical need of a great war.

The history of modern industry is the expansion of that happening.

When the metals were drafted for the present war, wood was required to take on double duty. Not only did it move shoulder to shoulder with steel and its fellows to the front, a part of every rifle and of every ship; but fabrication turned to wood to replace metals for an almost bewilderingly various lot of essential domestic supplies.

Babies need cribs and carriages and children need toys, war or no war; culverts must carry storm water beneath roads and railways; wives must have fasteners for their dresses and the time threatens when we'll all think about wearing woodsoled shoes. A population's domestic necessities may be largely supplied by wood, but it can't all be whittled out by hand. As a matter of fact it has been a long time since any considerable number of wood commodities have been.

Persons who have been led idly to the feeling that there must be something natively antipathetic between the machine age and our oldest fabricating material, wondered if wood could yield



Fabricated steel? No, mostly wood — hard yellow birch

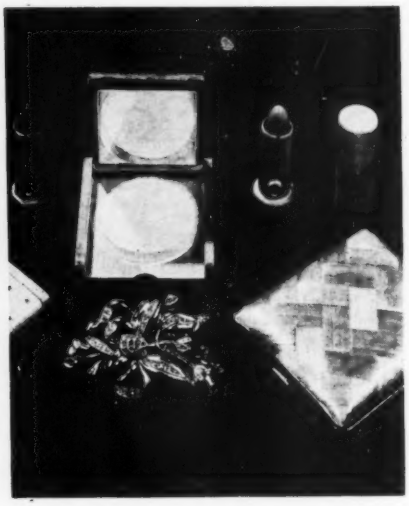
itself to the processes of modern manufacture easily enough to permit swift manufacture of enough replacement supplies.

They had forgotten the history of mass production; or not carried it back beyond Eli Whitney's application of the machine-tooled interchangeable-parts technique to the production of military arms. Whitney designed the first full battery of metal-working machine tools in 1798, but it was ten years later before he had finished his initial order of ten thousand muskets to be issued to American troops.

By that year a fully machine-tooled wood-working plant was uttering 130,000 ship's blocks every twelve months for the British navy which destroyed Napoleon's sea power and so left that upstart conqueror bottled on the Continent, ready to be trussed for his doom.

This was the wood-turning plant, its tools, the method of wood fabrication, and the purpose envisioned by Alexander Hamilton's dinner guest, Marc Isambard Brunel, one evening in 1777. Brunel had been a French royalist naval officer and engineer. He became an American citizen in 1796. Adventurously arrived in this country three years earlier as a refugee from the Jacobin guillotine, he found his first American employment surveying a tract of wild land in the Black River valley in Northern New York; an area in which fifty years later Indians still talked affectionately of the remarkable qualities of a forest-loving white man they called "Bruné."

He was engaged on the Hudson-Champlain canal and various river improvements; was an associate of Major L'Enfant who planned the city of Washington; himself submitted one of the competitive designs for the Capitol; designed and built the old Park Theater in New York; was appointed chief engineer of that city, built a cannon foundry, and had a share in planning the



Jewelry, compact, lipstick and cigarette holders—all of wood

fortifications of the Narrows in New York Harbor. But by now he would doubtless be forgotten if it had not been for his work with wood.

At the Hamilton dinner he met an arrival from England who described the methods by which pulley blocks were made and deplored their high and increasing cost. Ship block production was Britain's naval bottleneck. Brunel designed a mortise-cutting machine on the instant, doubtless using the Hamilton's table cloth as a sketch pad. Then he retired to Fort Montgomery, in the highlands of the Hudson, and worked out the rest of the tool battery; sawing machines, both reciprocating and circular, for roughing out wood blocks; boring, shaping, and scoring machines for finishing the blocks; machines for turning and boring the sheaves, for riveting the brass liner and face-finishing the sides, and for drilling pin holes; machines to turn and polish the pins; and several machines for making "dead eyes," or solid blocks without sheaves, used in fixed rigging.

His plans completed, he hurried to England. Napoleon was his *bête noire:* the British would fight him to the end, but America would not fight France. In addition, Brunel was in love with an English girl he had met in Rouen before he fled to this country. One of the fortunate chances of history brought him and his plans to the attention of Samuel Bentham, a great mechanic and naval engineer — brother of Jeremy Bentham, the English economist and humanitarian. Bentham built the famous "Portsmouth Block Machinery" from Brunel's designs, and a grateful Britain made him Sir Samuel and Brunel, Sir Marc.

Not an ounce of war-needed metal goes into these junior bicycles. Even the bolts are made of wood—and the kids like it

The oldest machine tool is the wood lathe. Notions of using precision machinery to make products in exact duplicate had been long in the air. Leonardo da Vinci anticipated some such tools in the fifteenth century, just as he did the airplane for a society not yet tooled to put his ideas into practice. A continuous-motion direct-drive pole lathe was pictured in the French *Dictionaire des Sciences* in 1772. Such a lathe could not have cut metal. It was purely a wood-working machine.

Modern industry was born with Brunel's machines for working wood and Eli Whitney's for machining metal —both designed in America. A few years later Eli Terry began using machinery to make wooden clocks; first at Windsor, just north of Hartford, and later at what is now Thomaston, Connecticut. By such interchangeable-part mass production he reduced the price of a wooden movement from fifty dollars in 1800 to five dollars in 1840. Two years later his pupil, Chauncey Jerome, applied Terry's clock-making technique to brass.

By that time New England was studded with machine-tooled wood-working plants, with the machine-tooling of metal running apace. By 1850 industrial tooling was substantially what it is now. There have been many improvements, but all the basic machine tools had been developed. Almost the whole metal-working battery had its prototype as wood-working machines. The wood-turning industries had long been ready for this war. The tools were there; conversion was obvious.

Take for example northern New England. In the three states eighty-five wood-working mills which had been making such peacetime products as clothespins, ice cream spoons, toothpicks, furniture dowels, and batons for dance-band leaders, out of Maine, New Hampshire and Vermont birch, now are working twenty-four hours a day turning out wartime supplies.

Consider the wood-working Maine town of Norway, and call C. B. Cummings & Sons a typical plant. It has been in business on the same site, using wood grown and regrown in the same forest section, for eighty-two years. The third generation of the family is now operating the mill, and the fourth generation is preparing to take over. Maine is the first American state that prophets of forest exhaustion said was "logged out," but it would be hard to get the Cummingses to believe it. Their plant is a group of low wooden buildings flanking a rushing stream, with three-quarters of a million feet of birch lumber decked on one side, and on the other a sawdust pile which covers an acre and is fifty feet high.

"Look," Mr. Cummings answers a visitor who deplores the sawdust waste.

Wood in this parachute flare base substitutes for aluminum

With an iron bar he lifts a huge manhole cover in the floor near the plant's furnaces. A black cocker spaniel, his constant companion—for Maine folk are an old people who prize the amenities of life—draws back with a wide grin to the shelter of the towering asbestos-cov-

All wood is this pattern for a Liberty Ship engine cylinder

ered boilers. The visitor leans over; leaps back. Beneath his gaze rushes a hurricane of fire. "Just sawdust and chips," says Mr. Cummings. "We blow it into the furnace. During winter we heat all the buildings on Main street. Amounts to quite a saving. That sawdust pile is our fuel bin."

Military secrecy bars visitors from most of the Cummings plant. But primarily it is a dowel mill. Dowels are

(*Turn to page* 186)

A new substitute is the wooden manhole cover, which can be made, along with many other items, at precision wood-working plants

Blue goose

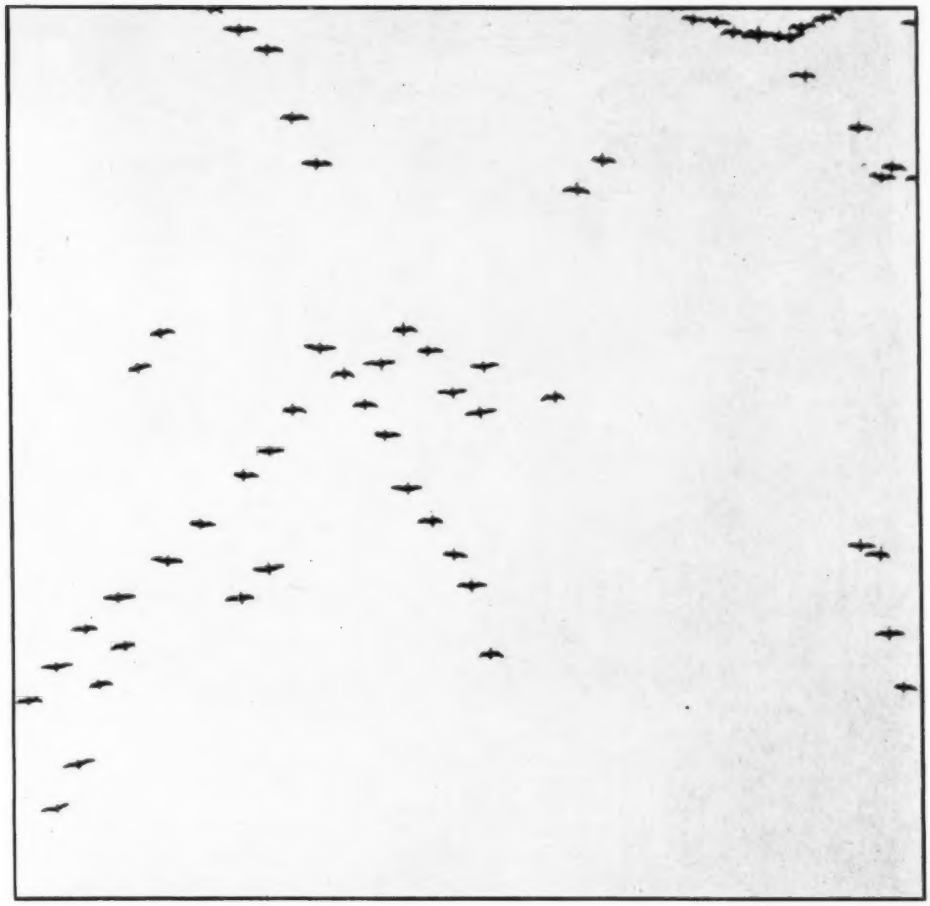
CANADA'S ANNUAL WILDLIFE SPECTACLE

By ORMAL I. SPRUNGMAN

ON a low-lying plain just west of Winnipeg, Canada, may be witnessed each spring one of the world's greatest spectacles. Here, on land sown to barley, blue and snow geese pile in by the thousands for a month's stay before taking off for their far northern breeding grounds on Southhampton and Baffin islands. Few realize the extent of this great concentration. No one knows exactly how many geese there are, but from early April to early May their flights seem endless. J. Dewey Soper, chief migratory bird officer for the Prairie Provinces, estimates that during this period from five to ten million birds flock to the Manitoba barley fields.

Once the migration starts — usually around April 6—the geese keep coming, night and day, regardless of weather. Sometimes, when misty rain makes

For a month each spring millions of blue and snow geese, migrating northward, rest and feed on the plains west of Winnipeg, providing one of the world's greatest wildlife spectacles



A regular flight pattern develops as the geese wing out for their foraging expeditions. They feed systematically on unharvested barley fields

visibility poor, their pulse-tingling calls can be heard above the traffic noises of Winnipeg. Some believe that the birds use the city lights for a guide when bad weather prevails. After milling around, they usually get their bearings and drift off towards their rendezvous at Grant's Lake.

It is difficult to convey to the reader the exhilarating effect of these wild geese voices coming down from the night sky. To many citizens, weary of Manitoba's long winter, it is the first tangible evidence that spring is at hand.

The geese usually are very canny, coming in about two gunshots high on a balmy south wind. They come up over the southern horizon, one flock behind the other, as though they were traveling a well-beaten highway. When they sight their ancestral resting place, they fill the air with excited cacklings.

When the migration is complete, huge flocks are scattered over a hundred square miles of territory. These vary from a few thousand to two or three hundred thousand birds. The low-lying land is dotted with snow-water pools in every direction. Barley is the chief crop and, when wet weather prevents much of it from being harvested, as was the case last fall, the geese find unlimited feed the following spring. They go to work systematically on a field, starting at one end and feeding forward like an advancing army. When they have cleaned up an area, they do not return to it. Their droppings are so thickly scattered that the farmer has his field fertilized free of charge.

After the first few days, during which time they sit around in dense companies, a regular flight pattern develops as the geese reach out farther afield on their foraging expeditions. They leave the lake at the crack of dawn and return an hour before noon. They leave again about 2 p.m., returning anywhere from dusk until midnight.

They seem unable to accept the airplanes which fly over them with increasing frequency. The huge flocks will explode into the air as if a volcano had erupted under them when a plane is still so far away that its motor is barely audible. They fly in the wildest panic, ignoring people on the ground. That the plane is a thousand feet or more above them makes little difference. Ducks, on the other hand, take small notice of planes unless they fly very low.

Twenty years ago, the blue goose was regarded as a rare bird in Manitoba. However, they have been steadily increasing in numbers until they now outnumber the snows by three to one. The two species are always associated, in migration, on the wintering grounds, and on the breeding grounds.

When the geese leave Manitoba about May 12, they fly northeast to Hudson Bay, where they feed along the tidal flats. Early in June, they head north to the known nesting grounds on Southampton and Baffin islands. They reappear late in September at the south end of James Bay, and are said to make a non-stop flight from there to Louisiana where they winter in the bayous and marshes along the Gulf Coast. With breeding grounds remote from Eskimo habitations, a non-stop flight over the densely populated states, and secure wintering grounds in federal wildlife refuges, they have escaped hunting more than any other large game bird. Their numbers have pyramided during the past twenty years.

BALSAM OF EL SALVADOR

Valuable in the Treatment of Wounds

By DR. RAFAEL GONZÁLEZ SOL

JUST as a solicism may, through incessant popular usage, become fashioned into accepted speech, so an outright misnomer may win ultimate acceptance not only in general speech but in scientific works. A good example of this is the "Panama" hat, a delectable headgear which in fact comes from Ecuador. In the forest world an egregious misnomer is the long accepted name "Balsam of Peru" for a product which does not come from Peru. It comes—and always has—from trees found abundantly and almost solely on a narrow coastal strip of El Salvador, which is the smallest of the Americas.

The tall balsamero, source of El Salvador's valuable balsam

The false name originated with traders of the Spanish colonial era who bought the product in Callao, Peru. It came, then as now, from El Salvador, which was at that time a part of the Captaincy General of Guatemala. Stout galleons bore it from Acajutla, a port of El Salvador, to Callao, whence it was shipped to Spain.

Thus the so-called "Balsam of Peru" is in reality—and this is its right name —Balsam of El Salvador.

The uses of balsam are many and varied, the most romantic being as a base for perfumes and healing salves. But its uses in internal and external medicaments are by far the most important. These are too widely known to recount here. What is not so well known is that several years ago certain Europeans, especially Dr. Dumont and Dr. Suter, discovered the notable effects of Balsam of El Salvador in the treatment of wounds. The process employed by Dr. Dumont is simple enough. It consists merely in drenching the wound with balsam and then covering it with a sterilized bandage. Anything which helps to allay the pain and havoc wrought by wounds is a thing of prime interest in these grim days of world-wide war.

Balsam of El Salvador, which comes from a tree of the botanical family *Fabaceae*, one of the new groups of the old *Leguminosae*, has so many scientific and popular names that it would be confusing to set them all down. It is loosely called "balsam tree," but this is like calling a spruce a "resin tree." The Spanish term, *balsamero*, is both handy and correct.

The balsamero is a beautiful tree. Its corrugated but lustrous leaves are dark green and have attractive, crinkled edges. They are small in size and lance-shaped. The flowers are delicate, pure white with a touch of yellow on the stamens. The fruit takes the form of a curiously shaped pod, wider and thicker at the end than at the base, and flaunting at the sides two membranous wings. Its seed, white and exceedingly aromatic, is kidney-shaped and wrapped in two layers of superimposed protective "flesh."

Often a hundred feet tall, the balsamero has a thick, well-formed trunk, extensive branches which form a vast green "bonnet," and bark the color of sienna brown. Its wood is of an odd violet-chestnut color with a very fine pore, rather hard and extremely durable. It resists the destructive action of climate and of wood-boring insects and is therefore much used in the construction of houses. It is also used for cabinet making, and its appearance when varnished is strikingly handsome. The trees live for more than a century and, if allowed to grow freely, they attain enormous strength, providing long and beautiful pieces of resistant timber for beams which will last for generations. Often, however, the demands of commerce require that they be pruned when young so that the work of extracting the balsam will be facilitated.

This tree of many uses is found in the south of Mexico, in Central America and in the northern part of Colombia, and it has even been introduced with partial success in distant Ceylon. But it is indigenous to the *Costa del Balsamo*, which is the coastal sector of the Republic of El Salvador, between the ports of Acajutla and La Libertad. Only in this fertile, undulating sector does it appear to be thoroughly at home and to grow spontaneously without need of cultivation. Here the world's largest balsameros are found and here also the best balsam product is procured.

The communities of the *Costa del Balsamo* are almost entirely Indian villages, bearing such mystic-sounding names as Cuisnahuat, Ishuatán and Tamanique. The inhabitants have devoted themselves since pre-conquest days to the extraction of balsam and today the industry is more vigorous than ever before. To travel through the balsam coast is to be constantly bathed in aromatic air of a penetrating but highly pleasing fragrance. The original Indian name of prepared balsam was *hoitzil-oxitl* but this has fallen into disuse even among the aborigines. It is now commonly called *Balsamo Negro* because of its reddish black hue, like the darkest of

red wines. The product illegally obtained from the same trees by a hasty, destructive method, is reddish yellow and is called by its primitive Indian name *tacuazonte*.

The process of extracting balsam is by no means simple, requiring various operations for which practice is necessary. Improper or clumsy work may cause the death of the tree. Operations may be undertaken at any time of the year but in the dry season the precious secretions are most abundant. Usually the period of the new moon, or the first quarter directly after the ending of the rainy season, is selected—and this is not a matter of superstition but of science, since the sap seems to flow much more freely then.

The worker selects trees of adequate age—twenty-five years and over—with fresh, healthy bark or with bark thoroughly healed from previous operations. Incisions are then made, great care being taken not to cut the bark all around the trunk. The proper operation is to leave a portion untouched so that the circulation of the sap is not interrupted, thus making the balsam flow into the tapped part. It is possible to tap the tree in such a way that the liquid flows in greater quantity in the incisions, but if this forcing method is used the flow is not uniform.

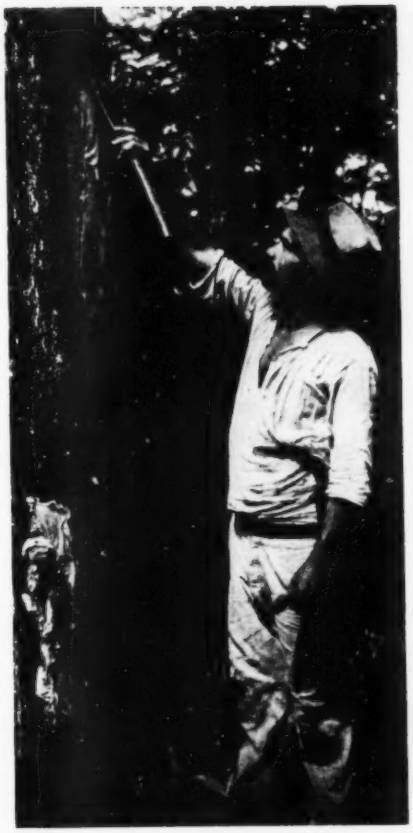
When a week has passed and the liquid has appeared in the exterior and tapped portion, the worker heats this portion by means of torches made of chimaliote rods, an operation which demands much skill since the least neglect can set fire to the tree and perhaps destroy it completely. A month or so after this heating process, linen cloths or rags of old cotton, washed with scrupulous care, are attached to the bark where the liquid comes forth in gradual flow. They remain there for a week to absorb the balsam secreted in that sector. Then they are unfastened and placed in large iron receptacles filled with hot water.

After boiling for half an hour, they are placed in a press made of strong cords of maguey fibre. This is attached at one end to a post. To the other end a lever is fixed and two men twist the press to wring out the balsam into an iron kettle. Afterwards the liquid is put over a slow fire to remove water and impurities. When cooled, it takes on its famous black color, earning the popular name *Balsamo Negro* to differentiate it from the crude, unboiled product which is of a yellow color.

Much balsam is extracted clandestinely by thieves who rob the balsameros of their bark at night. These wretched fellows, not yet adequately curbed by the police, loosen the bark from the trees, crush it and boil it in sacks of thick cloth. Then the balsam is extracted by the method already mentioned. The amount obtained by this process is almost triple that which is legitimately secured, but the stolen product, yellow-red in its final color, is of distinctly inferior quality. Moreover, this criminal process deeply injures the tree by totally cutting away the bark, after which the incisions can never heal properly.

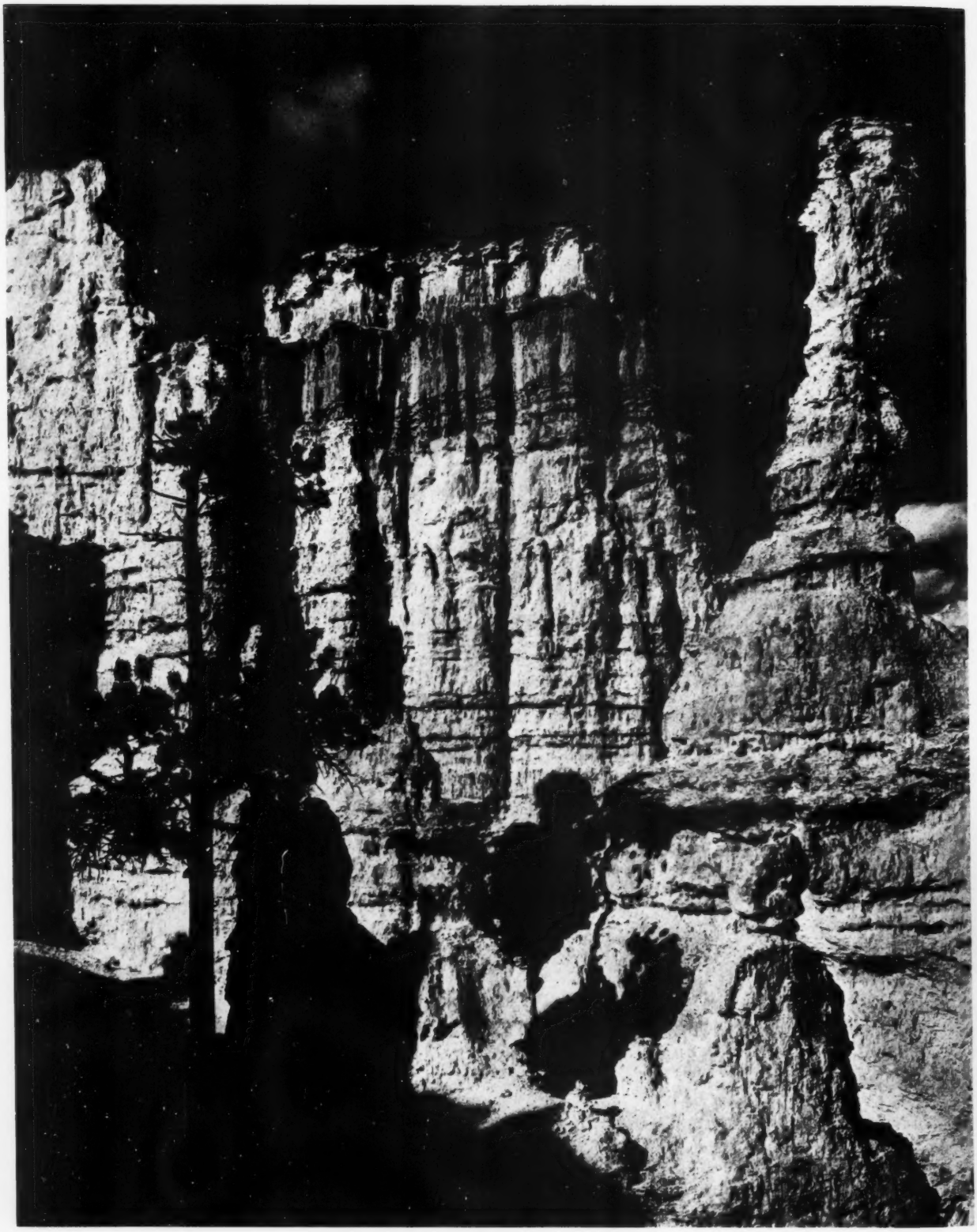
Balsam of El Salvador is a resinous juice characterized like all balsams by the presence of cinnamic and benzoic acids. It is a viscous liquid with a strong and pleasing odor and with a rather pronounced sharp, bitter, acid taste. It is not altered by contact with air and is completely soluble in concentrated alcohol and chloroform; partially soluble in ether, essences and oils. Its density is 1.15. Balsam is often secretly diluted by alcohol, oils and certain extracts but various laboratory processes exist whereby the presence of diluting substances may be easily detected.

Nature combines clemency and artistry in providing that a product which affords physical healing and sensory pleasure shall be procured from one of the noblest of earth's trees. Anyone beholding for the first time the beauty and majesty of a balsamero would be likely to exclaim "There is a tree fit for Olympus!" But nature has decreed that this hero of the forests shall be as useful as it is ornamental. Like a blood donor in times of stress, it shall give of its own life stream to save mankind.



Cloth, placed over trunk incisions, absorbs the liquid balsam as it gradually exudes

Boiling removes water and impurities. When cooled, the best grade of balsam is black—known locally as "Balsamo Negro"



Like a mighty studio is the earth—a studio in which Nature, with wind and water as her tools, is constantly carving and sculptoring masterpieces such as this in Bryce Canyon National Park

NATURE'S STUDIO

By RAYMOND E. JANSSEN

THE inquiring reporter of a great newspaper once asked a limited number of people to name the most beautiful spot each had ever seen. No two answers were the same. They ranged from great scenic wonders, such as are embodied in our national parks, to quiet woodland lakes, and jagged inlets along our rock-bound coasts. Of course, the considerations were limited to each individual's personal experiences; and yet, the opinions of veteran globe-trotters vary just as widely. And so we may conclude that those scenic qualities which are considered beautiful in the eyes of man are to be found in varying abundance and on every hand.

Unfortunately, however, the average observer sees sweeping valleys, towering mountain peaks, tumbling waterfalls, glistening woodland lakes, or trackless forests merely as so much scenery, incomparable and undescribable, mysterious and purposeless. It is one thing to gaze in awe across the abyss of some deep canyon; but it is quite another to see in its mysterious depths the grinding power of moving water which carved those vertical walls. It is one thing to stand enraptured before a towering, snow-capped mountain peak; and quite another to see upon those selfsame mountainsides the evidences of a mighty upheaval which changed ocean bottom to mountain top, and level plains to upended spires. In order to appreciate fully the magnificent scenes which lie before us, it must be remembered that they are uncompleted stages in a constantly shifting drama—a drama which is immeasurably long, but the movements of which we may discern if we look sharply.

Crumpled and contorted, these rocks in Glacier National Park in Montana show results of enormous pressure when ocean bottom is changed to mountain peak. Sperry glacier, at the left, is moving rock fragments toward the sea again

Example of rock layers, tilted on end and worn by wind and rain

Our earth, the relatively tiny spheroid upon which we live, has ever been in a state of continuous change. Stability, as existent upon the moon and some of the other heavenly bodies, is not a feature of our planet. The earth is constant only in the sense that it swings ceaselessly on through space in a never-ending circuit around the sun. Beyond that, our planet is exceedingly unstable; and it is this instability which has created, and is continuing to create, the panoramas which we commonly refer to as scenery.

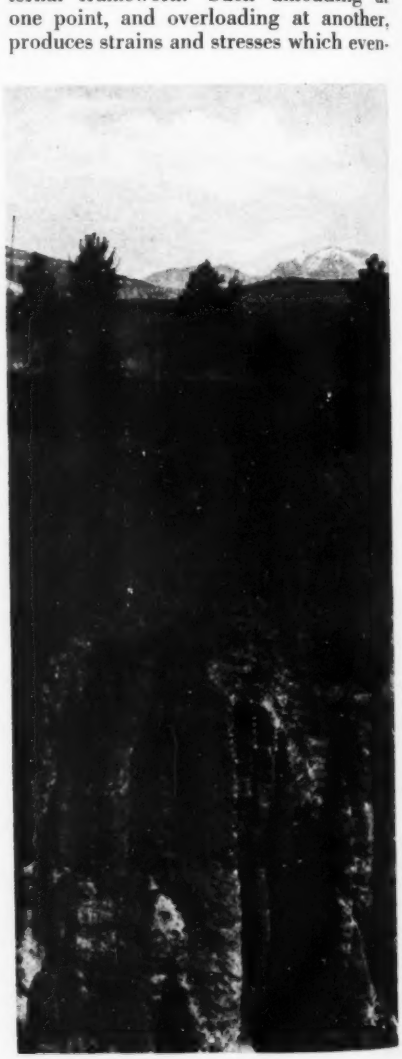
Evidences of this instability are present any place one chooses to look. We can see them in the little eddies of dust and dry leaves which whirl along the roadsides. They are present in the tiny grains of sand which are rolled back and forth upon the beaches. They may be found in the mighty glaciers which creep slowly down the highest mountain sides, as well as upon the arid floors of wind-swept deserts or in the steaming depths of dense, tropical forests.

The agents which produce this instability came into play when the earth, as a growing body, first acquired an atmosphere and a hydrosphere — in other words, gas and liquid, the most prominent of which are air and water. Aside from the basic rocks, every feature on the face of the earth, including life, is directly traceable to the presence of air and water. Without these two substances, our planet would be as unchanging as the moon. Without them, rain would not fall, lands would not erode, life could not continue, and scenery—as we know it—would not exist. Air and water, then, are the agents which have made our earth a unique and beautifully scenic body.

Fossil fern leaf, cast up by the sea, tells story of the ages

How is it, then, that such non-resistant and relatively insignificant agents as air and water should have such devious and far-reaching effects upon a solid earth? Primarily, it is because they are in motion. Moving air becomes wind; moving water resolves itself into currents and streams. Even water in the lakes and oceans has its surface activated into waves by the friction of the winds. All such circulations of air and water are caused by the unequal distribution of the solar energy which falls upon the surface of the earth. Consequently, whenever these agents, in motion, are in contact with the lands, they "drag bottom," so to speak, and mighty changes ensue.

This drag, or friction, tends to break off and move particles of the earth's solid material. Gravity controls the directional movement of these materials, and as a result, a leveling process is constantly in action upon the surface of the earth. As the lands are worn down and eroded, bit by bit through the ages, the resulting sediments are deposited eventually in the ocean basins. Such movements of material from the continents to the sea bottoms upset the existing balance, and as a result, mighty strains and stresses are set up within the earth's internal framework. Such unloading at one point, and overloading at another, produces strains and stresses which even-



Pattern in lava—and the volcanic mountain from which it came

tually reach the breaking point. Rocks snap, convulsions occur, earthquakes shake the ground, and ocean bottom may rise up to become high land again. Thus a new cycle in the age-long conflict between the land on one side, and the air and water on the other, begins anew, only to be repeated over and over again as epoch after epoch follows through the course of time.

Our earth, then, is like a mighty studio—a studio in which Nature is constantly engaged in the task of carving and sculptoring an endless series of panoramas. The wind and the water are the tools with which the work is accomplished. The loose stones and dust are the chips which have fallen as the mighty chisels carve out their works of art. But Nature, ever conservative, sweeps the tailings of her handiwork into her mighty catch-basin—the sea—there to remould them and eventually to raise them as new plaques for the reception of other masterpieces yet to come.

Rounded pebbles (top) reflect the relentless power of wind-tossed surf. Once angular slabs of stone, they have been worn smooth by being jostled together. Boulders (right) moved by a mountain torrent still retain original angularity, indicating they have not been subjected to the action of water for so long a period as the stones upon the beach

The work of tiny grains of sand, driven by the wind, are these mushroom-shaped rocks

DAIRY FARMING WITH SAWDUST

By D. W. GEESAMAN and T. G. NORRIS

THOUSANDS of tons of waste sawdust can be put to work producing food for the war effort. The procedure is simple, if you own a dairy farm, and inexpensive.

Most farmers, of course, know that sawdust is acid, and that its extensive use as a fertilizer will sour the soil. Either oak or pine sawdust, used alone, will discourage the growth of any leguminous farm crop. But add to that sawdust the urine of cattle and it becomes slightly alkaline. Such alkaline sawdust, or manure, is highly desirable for farm use. If you are interested in the chemical aspect, raw oak sawdust will test about PH 4.5, pine sawdust PH 5.5. After use in a dairy barn, the same sawdust will test PH 7.0 or 7.5, or slightly on the alkaline side.

An outstanding example of the use of wood waste in dairy farming is that of Wilbur F. Barkdoll of Mont Alto, Pennsylvania. This farmer, in 1915, purchased an eighty-eight acre tract close to South Mountains, in Franklin County. Sixty-three acres were of stony loam, the remainder mostly limestone—underlaid with limestone silt subsoil. Today, this would be called a marginal farm; in 1915 it was a "bumble-bee patch." Perhaps his neighbors best described it in a story they told their children. The devil, they said, was passing over the area with a bag full of stones, and when he got to the Barkdoll farm, the bag broke. Anyway, Mr. Barkdoll removed many thousands of tons of stone to bring the farm into its present state of productivity.

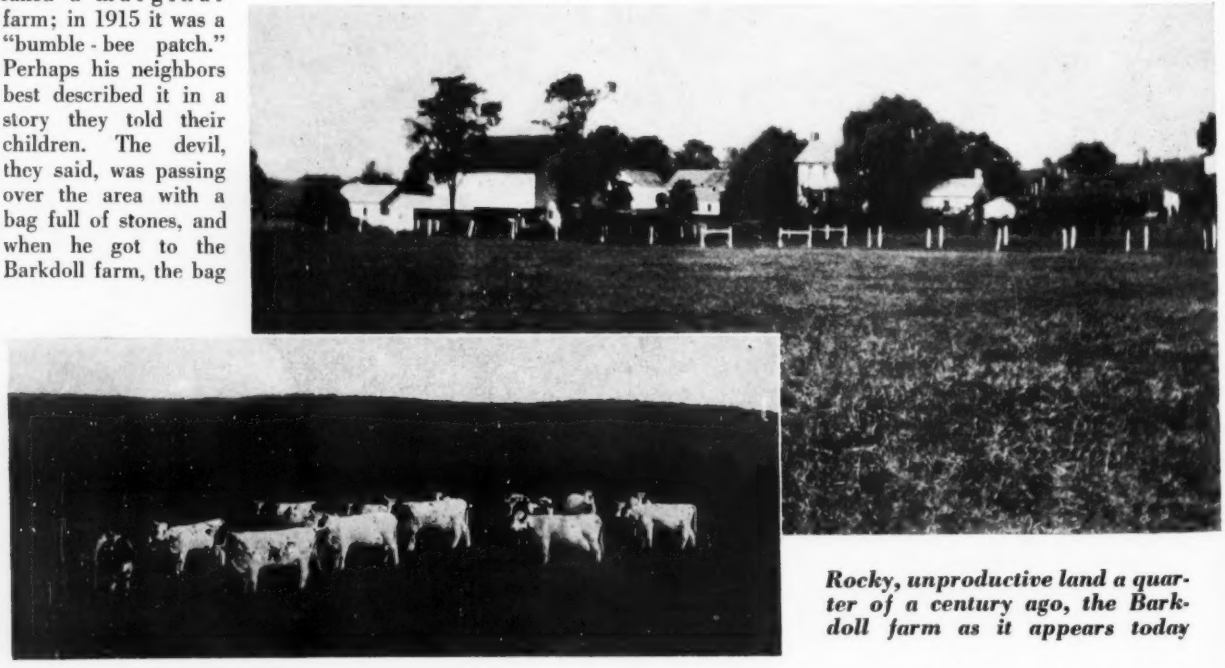
Although the house and barn were in fair condition, the barn floor was merely dirt and the barnyard little more than a hole in the ground. Several hundred loads of stone, part of it crushed, restored the barnyard, and a concrete floor was placed in the barn. This floor was unique in that there were no drains in the gutters back of the cow stalls.

From the beginning, sawdust and wood shavings have been used as bedding and as an absorbing medium in the main dairy barn. Since no drains are available, all moisture is absorbed by the mill waste, producing a manure exceptionally rich in plant food. Since wood wastes have a higher absorbing capacity than straw, the gutters are cleaned twice daily and the manure hauled out and spread on the fields.

When purchased, the fertility of the Barkdoll farm was low. The first crop of hay produced but six loads; wheat production was fifteen bushels an acre, corn seventy-five bushels. What has happened to the soil since this first crop can best be pictured by looking at the farm as it exists today. The barn and house have been modernized; outbuildings have been improved; a new milk cooling house has been erected, and equipment installed; a workshop for overhauling farm machinery has been built; and portable electric fences regulate the pasturing of cattle. You don't do these things on land of low fertility.

Yields since 1915 have been as high as forty-five bushels of wheat an acre, or three times the yield of the first crop; corn, 198 bushels an acre, or two and a half times the 1915 crop. But listen to this: the hay crop is twenty-two times greater, or 131 four-horse loads. Examining sample cuttings from Mr. Barkdoll's five-year-old field of alfalfa, orchard grass and ladino clover, J. H. Knode, county agent, had this to report last September:

"Reducing this thirty-two tons an acre of green hay to a dry basis at the rate of seventy-five per cent moisture in the green hay and twenty per cent moisture in the dried hay, the yield is twenty tons and twenty pounds of dry hay,



Rocky, unproductive land a quarter of a century ago, the Barkdoll farm as it appears today

Sawdust and wood shavings from the dairy barn played a major part in producing record hay crops such as shown here. Thirty-two tons an acre is not unusual on this farm

which I believe constitutes a record for this section of the state."

The animal units on this farm are six horses, forty milk cows, one bull, eighteen heifers, and seventy-five chickens. The maintenance of fifty-nine head of cattle and six horses on a farm, which at the time of purchase would scarcely provide hay and pasture for less than one-third that number is, in brief, an accomplishment that has won for Mr. Barkdoll the distinguished recognition as a Master Farmer, an honor conferred by the *Pennsylvania Farmer*.

Some of the materials used in improving the land were hydrated lime and marl, and when the quarry where marl was purchased ceased operating, pulverized limestone was used. For a number of years a complete 2-12-6 fertilizer was used at the rate of 250 pounds an acre (two nitrogen, twelve phosphorus, six potash). Recently, 200 pounds an acre of twenty per cent superphosphate has been drilled into the corn ground. The same quantity is also applied to wheat and to alfalfa at the time of seeding. Manure is applied to all grass after grain is removed, and is also applied to the alfalfa. As a matter of fact, there is seldom a day during the entire year that manure is not hauled to the fields and spread. In 1938 there were 710 spreader loads, or between nine and ten tons an acre a year.

Since the amount and quality of manure is the deciding factor in producing bumper crops, it may be of interest to see how it is obtained. As has been mentioned, the barn floor is of concrete and so constructed that all liquids flow into the gutters in the rear of the cows. After the gutters are cleaned, which is done morning and evening, several inches of wood wastes are placed in them. The alley-way between the gutters is covered with about one inch of shavings or sawdust, and the cows are bedded with several inches of the same material. Much of this is regularly swept into the gutters to absorb all body liquid. This manure is then shoveled into a litter carrier and taken directly to the spreader. When half a load is thus obtained, fifty pounds of superphosphate is scattered over the manure and the spreader then filled. The phosphate so placed is readily available as plant food.

Another theory proved in a quarter of a century on this farm is that liberal use of limestone dust or marl, together with a bountiful supply of sawdust manure, and this coupled with commercial fertilizer, produces roughage that contains all the minerals required by cattle for good health and vigor. Too, these minerals are in a form most readily assimilated by the animals.

In the production of manure at the Barkdoll farm, six tons of wood wastes are required each week in winter when the cattle are stabled, and three tons each summer week when the cattle are in pasture a good part of the day. Not less than 250 tons of wood wastes have gone on this land each year for the last quarter century. Thus, at the rate of three tons of wood wastes an acre a year over a period of twenty-five years, 6,250 tons have been used on the farm, a total of seventy-five tons an acre. These wastes disintegrate quickly and no chunks of sawdust or shavings are turned up when the land is plowed.

Assuming that 3,000 pounds of sawdust are necessary in the production of 1,000 board feet of lumber, one ton of sawdust would equal 666 board feet. If the 6,250 tons of sawdust used on the Barkdoll farm were converted into inch boards, there would be 4,166,622 board or square feet. Considering that the eighty-eight acre farm contains 3,833,280 square feet, there would be sufficient inch boards to cover the entire acreage, with enough left over to cover seven and one-half acres a second time. It is reasonable to presume that the sawdust placed on the farm since 1915, if applied all at one time, would form a layer of sawdust about three inches deep.

Where does this sawdust come from? Mr. Barkdoll maintains a truck with a large body for the express purpose of hauling sawdust and shavings from local mills. Most of this material is obtained without cost as local operators are usually glad to get rid of it. A mill within a mile of the Barkdoll farm supplies about five per cent of total requirements. The remainder comes from mills on Pennsylvania state forests and small woodlot operations within a radius of twenty miles. The sawdust from the state forests, mostly mountainous country, is chiefly pitch pine, that from the farm woodlots oak. Accessibility and shortness of haul, rather than acid content, are the factors which determine which sawdust pile will be used.

The use of wood wastes on dairy farms releases many acres that otherwise would have to be used to produce grain crops and straw for bedding. These released acres can be used in producing food crops and, in turn, more cattle can be raised for each acre of farm land under cultivation. Since wood wastes are considered at Barkdoll farm as superior to straw, and as straw is quoted on the local grain market at fifteen dollars a ton, a saving was made this past year of more than $3,750 in straw alone.

Wood wastes are used on this farm so that crops are grown profitably and they, in turn, produce sturdy, healthy cattle that make milk profitable, and, consequently, round out a farming program that can well be studied by foresters, farmers and woodland owners alike for the benefit of all concerned.

LITTLE KNOWN FACTS ABOUT FUR

By STANLEY P. YOUNG

The marten, often termed the American sable

SELDOM do Americans think of fur as having a fascinating historical background. They are content, it would seem, to associate it only with the continent upon which they live and the part it played in its development, especially the beaver era. However, fur has a long and interesting human history that dates from the Garden of Eden.

The lowly badger, for instance, was used under the direction of Moses for hangings in the tabernacle, in addition to skins of the ram. This incident, mentioned in the Book of Exodus of the Old Testament, seems to be the first recording of the use of fur as an ornament. Furs were also described in the apocryphal Book of Judith, for use by the nobility of Babylon in affairs of state, or as carpets for Judith to recline or feast upon.

This place of distinction occupied by the badger naturally leads one to wonder about the origin of its name. It appears to have come from substantive "badge" with the termination "ard" in reference to the white mark borne like a badge on the creature's forehead. At least it was so published in 1523. The name is believed by some authorities to be of Celtic origin. In Welsh and Cornish is found the word "broch" and in Irish, Gaelic and Danish the word "booc". The French once called it "le Gris" when referring to its color, and this name appeared in 1486 in the Book of St. Albans. Because it was supposed to eat corn it was also known as "blaireau", from the French Blé-corn. The English word "badger" may have been a corruption from the French *bécheur*, a digger —from *bécher* to dig.

There was belief among the ancients that the animal had legs shorter on one side of its body than on the other. Hence it was thought that this made possible its faster speed when running on the side of a hill or mountain.

The early Greeks and Romans apparently had no desire for fur. This was probably due to the fact that the barbaric tribes occupying the northern fringes of their empires invariably were dressed in fur at the time of their various invasions. Held in contempt, as these invaders were, it is only natural that the Greeks and Romans should abhor, likewise, the furs they wore. Then, too, the moderate temperature of the Mediterranian areas called for more comfortable apparel, mainly cloth weaves. Only in the mountains of the ancient empires did the inhabitants trade in furs and skins.

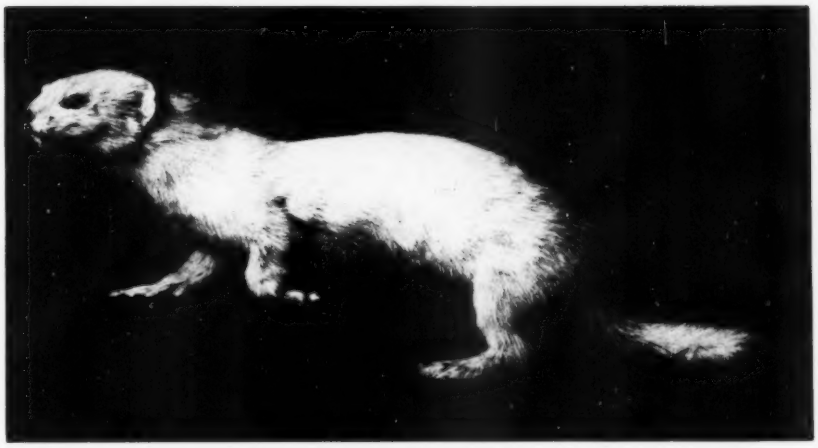
After the Christian era, however, the picture changed. There was traffic in furs throughout most of the Christian world. Even the Romans, by the sixth century, were dealing in furs and skins. This was due to the conquering barbarians from the north, who brought their fur customs with them. What furs were in demand, or most popular, is difficult to determine, although in a study of heraldry one is enabled to guess that they were made up of sable, ermine and several species of squirrels, the latter taken in Hungary and the southern provinces of Russia.

In heraldry, it will be recalled, ermine was represented by a white ground, with small black spots; sable was the black color in the arms of the nobles; and the various squirrels, after the skins were treated, were represented as deep blue. The supply seems to have been furnished from the existing countries of the Baltic, the headwaters of the Euphrates, as well as the Tigris, and from the Crimea.

Unlike the early Roman abhorrence of fur, the nobles of Persia seem to have used the choicest, probably sable. The custom was not so much for bodily comfort as it was for ostentatious display. The wearing of different species of fur animals, it seems, became in ancient Persia a symbol of distinction in the rank of nobility.

Ermine, which is the white winter coat of the weasel, has its origin from a contraction of the word "Armenia", the country from which it was first obtained in large quantities. In time it became designated as Armenian, then finally a corruption to the modern "ermine".

This beautiful fur came into use after the mountainous barbaric tribes of Europe and Asia had conquered the peoples of the lower valleys and river courses. In reestablishing themselves in more moderate climates, the conquerers found no particular need for fur garments, but could not discard their fur customs. Thus came about the evolution in fur apparel, with emphasis on its ornamental use. The heaviest and coarser furs and skins surrendered to those of finer texture. The beauty of ermine, plus its lightness in weight, brought it into widespread use — for incorporation in cloth weaves as an ornament. It may have been one of the furs that symbolized the distinction of nobility between the ancient Persians. More than likely its great beauty explains the eventual kingly use of ermine.



The regal garment of the Middle Ages, ermine—the winter coat of the weasel—was reserved for rulers and their families

With the advent of the Middle Ages and an expanding era of nobility, fur was in greater demand than at any previous time in recorded history. As might be expected, ermine was very much to the forefront as a regal garment during this period. Its delicate texture and the great number of skins required for a robe or garment, placed this fur in the highest scale of value. Some conception of the numbers required for His Royal Majesty's dress may be gained from Louis IX of France. He wore a surcoat, a dress mantle and a hat which, in their entirety, were composed of 746 ermine.

Along with sable, this beautiful fur was for centuries reserved for the rulers and their immediate families. Indeed, the civilian classes were compelled by decree not to dress in raiment made up of these furs, with the exception, of course, of nobles and the judges of higher courts. Even today, as witnessed at the last English coronation, these furs still have an important usage among the royal robes of the British Empire, probably the result of customs in vogue for many centuries.

With the advent of firearms, the custom of wearing fur as an insignia for the heraldry declined. One reason was that the armored knights, with insignia of colored fur in their coats-of-arms, became too ready targets for an enemy using a gun. Also, during the eleventh and twelfth centuries, the masses were permitted to use fur, but only of the more common kind, such as fox, badger, squirrel and lamb skins. Sable and ermine were still reserved for nobility. Mink, too, at this time was coming into noble usage.

Some authorities hold that the introduction of silk, which in time did much to supplant fur as dress goods, created the incentive for the manufacture of plush and velvet as an imitation of fur. Well might this be, for often it has been the denial of certain goods to the "have nots" which brought about discoveries and inventions of substitutes in imitation of the finer and more costly article. Then, too, Dame Fashion probably played a part, for silk, plush and velvet were much lighter and more adapted to dress and trimmings than the heavier fur.

With the discovery by Sir Richard Chancellor in 1553 of a passage around the North Cape to Archangel, the English came to the forefront as fur traders with Russia, whereby silks and woolens were exchanged for the more valuable Russian furs. This appears to have been done under the protection of the Czar, for this ruler collected during the sixteenth century much tribute in the form of the rare furs, particularly the Russian sable, at that time the predominating fur of the Russian nobility. The fur tribute extended throughout all of Russia's holdings and, by the middle of the seventeenth century, even to the Kurile Islands.

This, briefly, is the background to the question of why the English seized with such avidity the fur trading opportunities afforded in the New World, and the eventual incorporation in 1670 of the Hudson's Bay Company. Simultaneously, French traders were availing themselves of a similar source of wealth, but the eventual loss of Canada to France eliminated the French trade from the picture approximately a century later, in 1762.

North American fur companies and individuals, during the century and a half following the chartering of the Hudson's Bay Company, developed a fur nomenclature that is "All American," having no apparent Old World connection from which it might have been corrupted. Among the terms in general use

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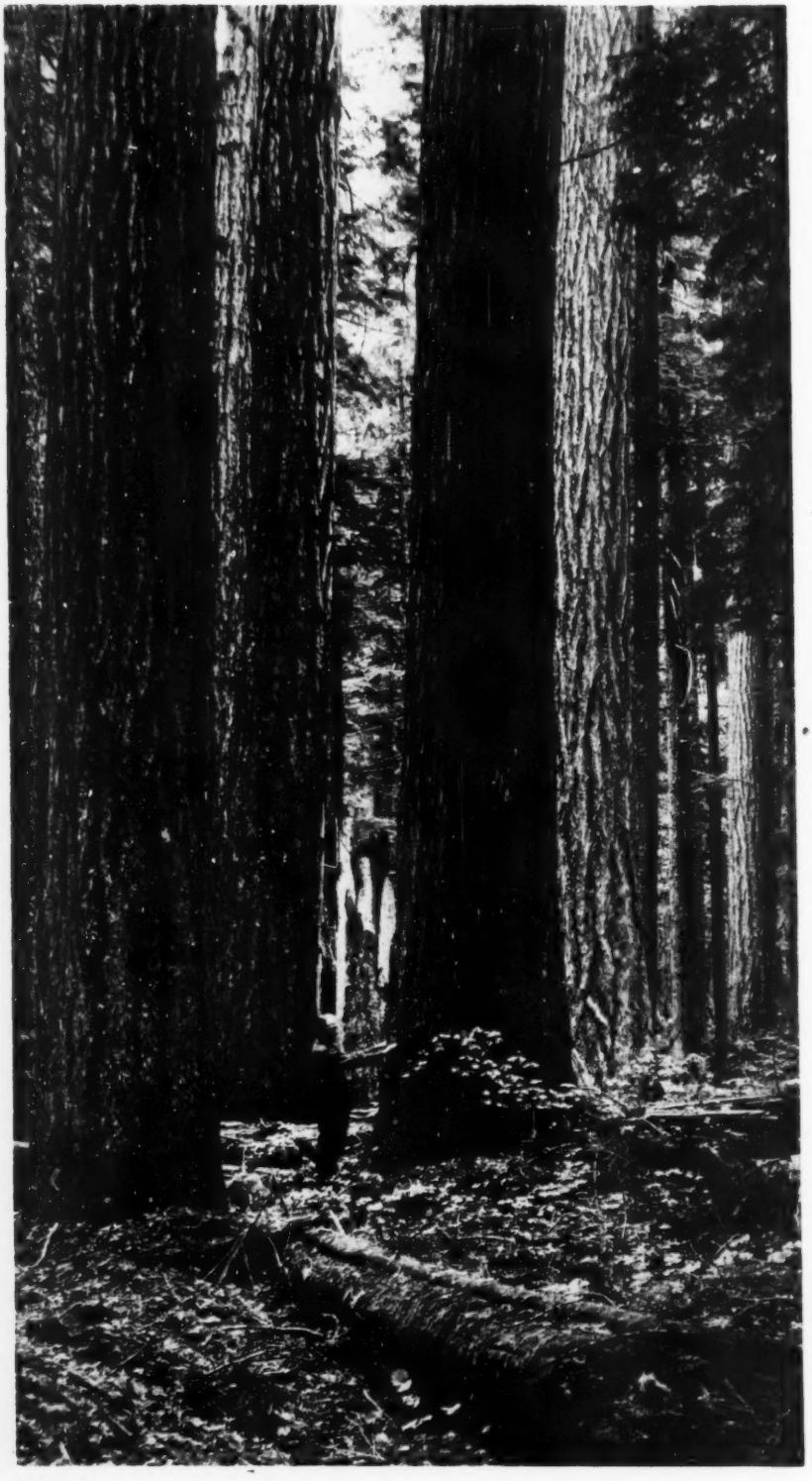
Skins of the lowly badger were used by Moses for hangings in the tabernacle—the first recorded use of fur as an ornament

SOUTHERN PINE vs. NORTHWEST FIR

Which Region Can Grow Wood Most Rapidly?



By CHARLES ROBERT ROSS

AMERICANS use two-fifths of all the wood consumed in the world, and there are two good reasons why they enjoy such abundance. Within their nation's borders are two of the most productive forest areas on the globe—the Douglas fir woods of the Pacific Northwest and the pinelands of the Southeast.

These forest regions produce far more timber than they use. As a consequence, they have long been great lumber shippers. Although they occupy opposite corners of the country, their products have been in vigorous competition. Especially has this occurred in the forest-deficient East and Midwest. Here in normal times steady streams of lumber from the South encounter like streams from the West—boards from each forest often meet in the same building. Competition also extends back into the forests where the growing capacities of the two species are ultimate factors in production.

From the standpoint of future production, it is pertinent to compare the rates of growth of the two forests. Iowa, leading corn state, can average fifty bushels an acre; Kansas averages fourteen bushels of wheat an acre; Texas, 200 pounds of cotton. Timber is mostly measured in board feet. How many board feet can these two leading forests grow? Which can, or will, outgrow the other? Before examining these leading contenders for timber-growing honors, let's describe them more particularly.

In the northwest corner of the United States is the growing domain of the Douglas fir. It embraces roughly the western thirds of Oregon and Washington, an area 125 miles wide and 480 miles long—nearly 28,000,000 acres of forest. In this region of steeply piled mountains, foaming streams, and tall thick woods, the Douglas fir species makes up two-thirds of the total timber stand.

In the southeast corner of the nation we have the southern pine region, a land altogether different in appearance, level as a table in large part, although the northern flanks do break into gently rolling hills. From Virginia to Texas,

The Pacific Northwest—a fine stand of 400-year-old Douglas fir

averaging from 200 to 300 miles inland from the Atlantic and Gulf coasts, the green pines wave for a distance of 1,200 miles. The four southern pine species —loblolly, shortleaf, longleaf and slash —predominate over an area of about 115,000,000 acres of the forest.

During 1939, a lumber cut of 25,000,000,000 board feet was reported for the United States. Of this the Douglas fir and southern pine regions accounted for over sixty per cent, although together they comprise less than a third of the nation's forest area. The western region produced a total of about 7,500,000,000 board feet while the southern pineries produced close to 8,500,000,000. With only one-fourth as many acres as its southern rival, the fir region supplied almost as much lumber.

The capacities of the respective forests to grow timber obviously cannot be rated on amounts of lumber now being sawed. The Douglas fir region is like a young man still going through a vast inheritance, in that it represents a tremendous storehouse of timber—the accumulation of centuries for Northwest lumbermen to draw on. Nearly all the lumber produced comes from very old, large trees. On the other hand, lumbermen many years ago swept up and down the southern pineways with the result that the virgin timber is nearly gone. The great bulk of the pine produced now is second, third, or fourth growth after cutting of the original forest. The southern region, therefore, now has to spend only what it can earn through new growth.

The only way to compare the permanent timber producing abilities of the two regions is to estimate what each can do in growing new crops of trees. The actual facts on forest increment are not easy to compare, although boosters native to each section feel little restraint in claiming first honors. Anyone who has been associated with forestry and lumbering in the two regions knows how confidently the timber growth in each is upheld as "the best in the world." I have lived in both sections and have been impressed by the abandon with which local pride may go instantly into eruption on the subject.

From my own experience, I believe the more optimistic expressions are heard regarding southern pine, not only within that region, but perhaps outside of it as well. I believe this impression comes partly from the examples of very rapidly grown pines that are often shown. Recently, I saw a section of loblolly pine that grew over thirty inches in diameter in fewer years. When put on exhibit, a section showing wide growth rings has quite a far-reaching effect on the public mind. Not so well known is the fact that it takes exceptionally favorable conditions to produce these "show pieces."

Southern pine's reputation for growth has also been spread by the way the tree mushrooms upward during the sapling stages. At the 1936 convention of the Society of American Foresters in Atlanta, the late Dr. Charles H. Herty, famed promoter of the southern pulpwood industry, ended a talk with the statement that he "was leaving to visit a plantation of slash pine five years old and twenty-five feet high." Twenty-five feet in five years is rare, but a height growth of three feet a year is not. Southern pines do climb fast in the early years.

Now, to the question: which region

The South—a well stocked stand of second-growth loblolly pine, about fifty years old

can grow timber most rapidly over large areas in terms of average growth per acre in sawtimber rotations? Carefully collected data are available covering growth in both regions, but they were obtained for this or that purpose and comparisons can become quite involved. So I sought the opinions of men who are in a position to know most about the growth of the respective forests. For the Douglas fir region, I went to Thornton T. Munger, principal silviculturist at the Pacific Northwest Forest Experiment Station in Portland, Oregon. It would be hard to say exactly who knows most about Douglas fir, but so many foresters would name Munger that any interviewer would be glad to present his opinions as the best obtainable. Munger has been studying or directing studies of the Douglas fir region since 1909.

To him I explained that I wished to make a comparison of the rate of timber growth for southern pine and for the region he knew so well, that without getting into curves and tables for multifold forest classifications I hoped to obtain a simple, everyday statement of opinion on the following question: What is the average net growth per acre in board feet that could be attained over the whole Douglas fir region under good yet practicable management?

"In comparing the possible yields of our northwest fir region and your southern forest," he said, "an adjustment is in order. All lumbering operations produce a great deal of low grade timber that has to be used locally because you can't afford to ship it. Out here we have a tremendous supply of timber and a light population. Furthermore, wage rates in our lumber industry average more than eighty cents an hour. Low-priced timber cannot be handled. Consequently, we are not able to use as much of the tree as they do in the South where labor costs are lower and where local markets easily absorb the low-grade lumber. There they not only use the very knotty portions of a tree, but can also use trees as small as ten inches in diameter, which we do not count on here. Since timber growth is measured in terms of the timber that is to be utilized, a fair comparison of growth would require that one forest be utilized as closely as the other. The growth I am going to mention is based upon the standards of timber utilization we look forward to here. Utilization of southern pine will be closer, so you should raise our figure by some kind of differential if it is to be compared with the South.

"I am going to say that the 27,000,000 acres of the Douglas fir region can attain, through good, yet practicable management, a net annual growth of 500 board feet an acre. This is based upon closer utilization than we have today, but not as complete as they have in the South."

An easterner is impressed with the fact that so many things are bigger in the West and its timber growth is quite in line; certainly a forester would feel he was in high-powered woods where they speak of yearly growth over millions of acres as averaging 500 feet to the acre.

Had I understood Munger correctly?—could 500 board feet be too high, by any chance? To check up I had some correspondence with him several months later. This time he was able to refer to a new store of data. Under the direction of H. J. Andrews and R. R. Cowlin, field parties of foresters had for a number of years been engaged in the most thorough inventory ever made of the forest resource of the region. It was part of the nation-wide Forest Survey authorized by Congress in 1928. The newly published report of the Survey, Munger pointed out, pictures the potential growth for the Douglas fir region substantially the same as his previous estimate of 500 board feet.

What do the experts say about the southern region? It is four times as large as the comparatively compact Douglas fir area, and much more diverse in its makeup, not only from natural endowment, but also from long human use and misuse. At New Orleans, two men are well qualified by long experience to speak authoritatively on the subject. One is E. L. Demmon, director of the Southern Forest Experiment Station; the other is I. F. Eldredge, director of the Southern Forest Survey.

When I put before Director Demmon the sort of question asked Munger—but applied to the southern pine type—he immediately thought of the other man, Eldredge. Both have offices in the same building. I explained that I wanted to obtain opinions from both.

"Well," said Demmon, "let's divide the question. From our experimental forests I can give you some good figures for shortleaf-loblolly stands on good sites. This type tends to be a sort of 'upper half,' so to speak, of the whole southern pine forest, but it is very extensive. Offhand, I would say that the maximum net growth per acre in board feet likely to be attained in well-stocked shortleaf-loblolly stands, with the best cutting practices that are practicable and with fire control, would be 500 board feet an acre a year. I think this is a safe figure, but please understand, it applies only to the particular type mentioned under good conditions of management, and does not represent the average expectation of all types, sites and stocking for the South as a whole. Now, for your over-all figure covering the 115,000,000 acres of southern pine area, Eldredge is your man. I don't know of anyone better qualified to give you a growth figure for that."

Eldredge gave me his answer. "My estimate would be 360 board feet an acre. I have in mind taking all of the sawtimber, with minimum waste, at the proper time from stands as fully stocked as the species, the site, and good management would allow. I believe you can use this figure for the southern pine region with as much confidence as can be expected in a projection of this nature."

Eldredge's opinion is backed by a most thorough knowledge. He has had more than twenty-five years' experience as a forester in the South and, as chief of the southern Forest Survey for the last nine years, he has brought together the most comprehensive collection of field data yet assembled on the forest resources of the eight states in his territory. When he says that 360 board feet is a safe estimate, he has Survey coverage of 82,000,000 acres of pine types upon which to rest his case.

The remaining acreage of southern pines is in the Carolinas and Virginia. E. V. Roberts, regional Survey director there, says, "Pine areas show as good growth possibilities as those in the Deep South. If Eldredge says his pinelands can grow 360 board feet, ours can too."

And so we have growth estimates for the nation's two leading forests as given by experts. The southern pine area can average 360 board feet an acre, the Douglas fir woods 500. But the figures cannot be left that way. As stressed by Munger, the figure for the Northwest should be raised by a certain differential to what it would be if its trees were harvested "southern style." It is hard to picture the intensive utilization of the South in the big timber of the Pacific Northwest. No man has the exact answer. Opinions I have from experienced foresters indicate that perhaps fifteen per cent more lumber would be obtained from the western trees by utilization possible in the South. That raises the Douglas fir figure to 575 board feet an acre annually, making the final score 575 to 360.

This score is based on growth attainable under more or less ideal conditions. But there is more to the growth question than forest potentialities under ideal conditions of management, as these will probably never be realized. It is in order, therefore, to consider what seems likely to happen. Do economic and physical conditions encourage each region to incorporate the forest practices necessary to realize maximum growth? In other words, what is the outlook for intensive forestry in each region? What trends are discernible?

"Here," say the southerners, "is where we have something to show." It is re-

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Editorial

Pattern for Spring

IT has been written that this may prove the most fateful spring in all history. Certainly there has been none more poignant with expectancy. The tide of defeat is running low. Victory, that bright star of hope, is in ascension. And with its rise is tempered the will of free peoples to remain free. With it the despair of the suppressed is softened in prayer for the resurrection—the new life of which each bursting bud is the symbol.

Spring heals and restores. It patterns new concepts, promises rich rewards for our efforts. Things grow, and ours is the good fortune to grow with them. Skies clear, and so may our minds. Nothing is static, movement is sure—and so may be our purpose.

Now, then,—this spring—is the time to look ahead, to re-examine ourselves, our work and our plans in the light of achieving first of all Victory, then the Freedom of Peace for which we fight. To those concerned with our forests, the need for such an appraisal is obvious. They know that total war is having a profound influence upon forest conditions throughout the world. Strains upon wood supplies, at home and abroad, are already discernible. Post-war needs are building up.

No tree needed for Victory should be spared, but because they are a major factor in both the wartime and peacetime economy of the nation, our forest lands must be maintained in a state of productivity. Here is a post-war problem that faces us *now*. It will not be solved by complacently saying that when peace comes we shall get busy and determine how the war has affected our forest position and what ought to be done about it. Such an attitude will leave public and private forestry far behind the forward thinking and planning of other groups which are preparing now to make their best contributions in the best American way to an orderly and successful transition from war to peace. Forest interests no less than public interests must have first of all a factual floor upon which to stand at the war's end when the gauntlet of reconstruction proposals will have to be run.

The undetermined effects of war are challenging and will increasingly challenge the reliability of present information as applied to current and post-war forest conditions. The remedy for this is obviously a critical and impartial reappraisal of these conditions. With this accomplished, forest interests will be in a firm position to speak factually and to present proposals supported by showings of current conditions as respects forest needs. They will, in short, be able to base the case of long-range management of forest resources on well organized facts rather than on theoretical or fragmentary reports.

Believing that preparedness in this direction is imperative, The American Forestry Association has resolved to sponsor the study outlined on page 151 of this issue. The proposal is not intended as an exclusive Association activity. It is being undertaken with the hope and belief that the need of such a project is so self-evident that it will have the support and cooperation of all who want to see forest management obtain rightful recognition and acceptance in post-war economy.

Yes, spring is the time to look ahead —and the course we take this fateful year may drastically influence the lives of all who use the forest and its products.

No Mass Slaughter

Press comment, following in the wake of the eighth North American Wildlife Conference in Denver, has developed, as *Time* put it, "some mouth-watering news for food-rationed U. S. citizens." The prevailing idea among many seems to be that an over-abundance of game, resulting from war's curtailment of hunting, may release for the average meat-hungry citizen a supplementary market supply of venison steak or quail on toast. The argument seems to be that unless some sort of mass slaughter is imminent, game surpluses will take matters in their own hands and eat themselves out of habitat and health. And this doesn't quite add up,—to food-conscious citizens.

This confusion in the public mind is most likely due to unfounded conclusions as to the wildlife situation under conditions of war, plus an ample dose of wishful thinking. Generally speaking, improved wildlife management, reduced bag limits and good game laws over the past ten years have brought about large increases in many forms of game birds and animals. To assume, however, that for the country as a whole there are surpluses sufficient to warrant mass slaughter for civilian consumption, even were it desirable, is stretching a point a bit too far. In some local areas this may be true, as it has always been true, but certainly it cannot apply to the national wildlife scene.

Nor can this increase, as many seem to believe, be attributed solely to war's curtailment of hunting. The facts simply do not bear this out. We were at war in 1942, yet the hunter's harvest of a quarter of a billion pounds of game exceeded that of 1941 a pre-war year. More duck stamps — and these mean hunters—were purchased last year than in the season prior to Pearl Harbor. Men close to the scene are of the opinion that the 1943 hunter crop will equal that of 1942, will exceed the pre-war crop of 1941. An indication of what is ahead is the revelation that more people were hunting for the first time in 1942 than in any previous year on record. New sportsmen are filling the ranks of those seeking bigger game on foreign battlefields.

All of which points to what every game manager knows—and what the public should know—that if normal hunting pressure is maintained, along with proper management, wildlife will hold the gains it has made without suffering either mass starvation or serious deterioration. It would be more to our way of life, and certainly less harmful to wildlife, to see that it is maintained.

YOUR SHADE TREES:

PLAIN FACTS ABOUT TRANSPLANTING

By L. E. MANNING

HAVING discussed in the previous issue the transplanting of a tree, it may seem strange to be considering now the factors that go toward its preparation for transplanting. Actually, it is the proper order, for only after seeing the complete problem can its solution be predicated. The point is this: Extra care and labor can make a poorly prepared tree survive, but a properly prepared tree will live even after delays and accidents, and it will positively burgeon if intelligently planted. In other words, only by thoughtful preparation can one easily enjoy the thrill of outstanding success.

It must be kept in mind always that in the root lies the entire problem. Throughout the transplanting as well as afterward it must continue to obtain from the soil the dissolved salts which are food and drink to the tree. Except in the winter dormant season, this constant supply cannot with safety be stopped even for half an hour. Obviously, if the entire root system, including the feeder-hairs, could be laboriously dissected out of the soil, moved to a new situation, gently buried and carefully water-soaked, the tree would survive beautifully. But a tree between six and twelve feet high has a root system far too large to dissect out, and the preparation of such a hole for its reception is altogether too onerous. What is usually done is to cut the roots down to a practical size, and nursery methods of culture permit safe planting of such a tree with about two feet of root spread or depth.

Commercial Nursery Practice

The commercial nursery method is to prune the roots at the seedling stage and every year or two thereafter. As the root forks every time it is cut, a mass of divided roots is thickly set about the bottom of the trunk after two or three prunings. A two-foot spread of such a root system contains as many feeder-hairs as a six-foot spread in nature. Moreover, handling such a small root can be done gently; and gentleness is of the uptmost importance in digging a tree. A few rough shakes makes the tiny lumps of earth fall off the smallest hair-roots, frequently taking the rootlet with them. When nursery-grown trees are shipped, they are carefully wrapped, tightly tied to prevent this happening, and moist packing material is placed inside the wrapping to prevent complete drying out.

Here, then, are three points to watch the next time you order a shipment of nursery trees: Is the root system much divided, indicating several transplantings? Is it tightly wrapped? Is the packing material inside the wrapping still moist? If the root system looks sparse, it must be water-packed into the soil so as to make extra good contact. Also, an extra amount of top and branch must be cut away so that the root has less food and drink to supply. If not tightly wrapped and tiny hair roots are missing, precisely the same procedure must apply—even though the roots be well branched. If the packing material be dry, then the whole root must be immersed in water for several hours before planting. An overnight soaking of the whole tree, weighted down with stones in a lake or brook, will more often than not save the most dead-looking of trees.

Transplanting a Wild Tree

From the above it is obvious that a tree eight or ten years old and growing in the wild—a tree never transplanted—will have a troublesome root system to move. Much can be done to simplify the problem, however, by starting a year ahead. You begin in April or May by digging a trench completely around the

PRUNE
PRUNE
PRUNE
1. UNDERCUT TREE AS SHOWN, THE JOB IS FINISHED IN THE PICTURE
2. FILL BACK SOIL UNDER AND AROUND ROOTS AND WATER WELL
3. PRUNE AS MARKED
4. WAIT ONE SUMMER AT LEAST BEFORE DIGGING AGAIN FOR TRANSPLANTING

Preparing the wild tree now to withstand the shock of transplanting during its next dormant season

tree, perhaps eighteen inches deep for a ten-foot tree, and about eighteen inches away from the trunk. After this make a slope down on one side for easy access and, with a sharpened spade, tunnel a horizontal slit under the root ball, cutting roots as you go. It is not necessary to cut all roots, but the center should be passed and the main tap root, if one exists, found and severed. Then pack the soil back in the under-cut, fill in the ditch and give the whole a thorough soaking. Leave it strictly alone for the summer. Such a tree will sustain about half a full transplanting shock, but since it is not actually moved, many of the hair-roots remain in contact with earth. Because of this, it will not die. Instead, throughout the summer, hundreds of new feeders will grow out from the root system. In the fall, or the following spring, the tree can be safely transplanted into a hole slightly larger than the three-foot ditch originally dug, and with comparatively little labor or violence. The hardest thing about it, in fact, is the restraint upon one's impulse to move the tree immediately rather than wait for the next dormant season.

It is plain that the more roots remaining in contact with earth, the less shock there is in transplanting. To dig a tree with even a small solid ball of earth, tightened in canvas and burlap, is a safe method but requires so much dead weight that it is usually only undertaken with special machinery.

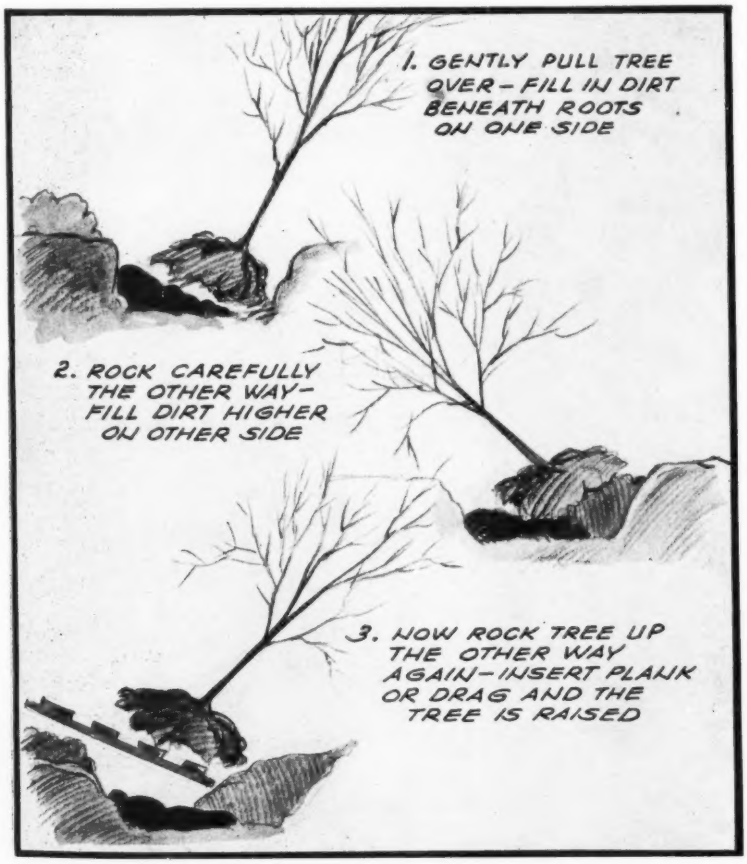
The Question of an Earth-ball

For most deciduous trees less than twelve feet high, moreover, it is quite unnecessary. If the root system is not too heavy to handle there is no point in shaking dirt from the roots. On the contrary, leave all that will remain.

A nursery-grown tree is usually shipped with nearly clean roots, or, at most, roots puddled in clay. But such trees have been frequently transplanted or root-pruned. A native tree, root-pruned but once, will have less than half as many rootlets, and every tiny clod that clings to a root heightens the prospect of successful moving. A safe rule is to remove gently just as much earth as lightens the weight sufficiently for practical handling—no more.

A root system three feet across will be too heavy for one man to lift unless practically all earth is removed. But a good deal of earth may remain if the tree is dragged instead of carried. Two short planks with a few cross boards make a good drag. Very often it can be slipped down under the roots and thus aid in lifting the tree out of the hole. If too heavy for this, pull the trunk over until there is space beneath the roots on the opposite side. Fill this space with earth, then gently rock the tree over until it leans in the opposite direction and more earth can be filled in under the remaining side. The root system can be raised entirely out of the hole by repeating this process several times.

It is obvious that the planting hole should be dug before the tree so that the roots are exposed to air the least possible time. Even then, a careful workman will have damp burlap with which to cover the roots in transit.


1. GENTLY PULL TREE OVER – FILL IN DIRT BENEATH ROOTS ON ONE SIDE
2. ROCK CAREFULLY THE OTHER WAY – FILL DIRT HIGHER ON OTHER SIDE
3. NOW ROCK TREE UP THE OTHER WAY AGAIN – INSERT PLANK OR DRAG AND THE TREE IS RAISED

Steps in lifting out the tree with heavy, earthbound roots, when you are ready to plant it

Pruning Top to Balance Roots

A rule of thumb is that the root system of a tree is as wide and deep as its top. This is not literally true in most cases, but it gives a clue to the amount of top pruning that must be done in order to balance loss of root. Even a nursery tree, many times root-pruned, has its top and branches cut away about one-third. In the case of a tree moved from the wild it is safest to cut all branches below six feet flush with the trunk. Trim the top so as to leave hardly more than a pole with a few small twigs and two or three shortened branches. Use a sharp saw and a sharp knife and paint all wounds an inch or more in diameter. The best known paint is Bordeaux mixture and linseed oil—half and half.

This pruning can be done before digging the tree, thus making its weight that much less; or it can be left until after transplanting, when proper appearance can better be judged. Or it can be half done, leaving additional branches which may be saved if the tree thrives immediately, but which can instantly be sacrificed should it be slow to start into leaf. The more leaves, the more work the roots have to do and, if a greater demand is made upon them than they are capable of fulfilling, then the tree will start to die. This can be plainly seen in the drooping leaves. Water at once, of course, and cut away still more top to prevent its recurrence. There is almost never a case of too much pruning. The danger is the other way around.

You may have a neighbor or friend who is "green-fingered" — for whom everything seems to grow. If you will carry in your head the elementary fact of what makes a tree thrive and the simple and easy controls that are here described to aid the process, you will have no need to envy him. There are few tree mysteries that elementary understanding cannot overcome.

Tree Trails . . .

Across America in Search of the Rare and Unusual

SPRING is the time of year the mind turns to the maple. In New England and other sections of the East sap is running, trees are being tapped, black kettles boil on the open fires, and a new crop of maple sugar and syrup is in the making.

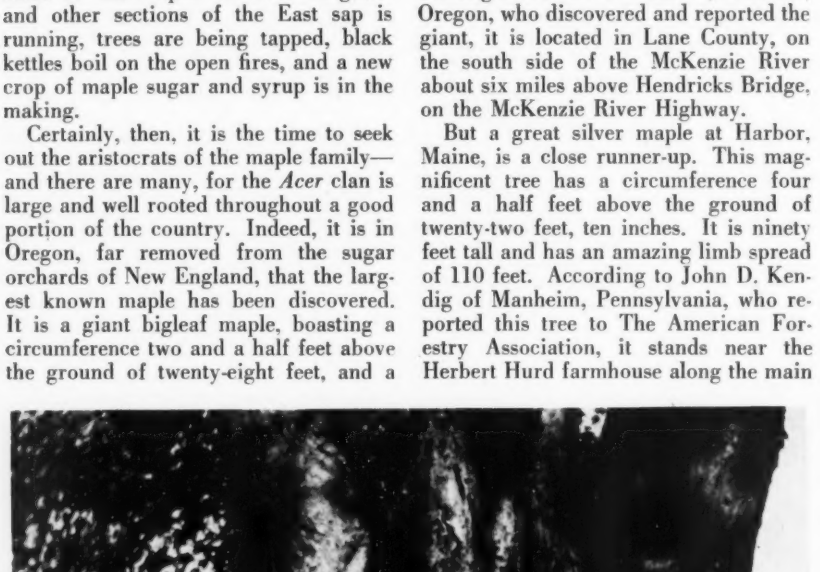
Certainly, then, it is the time to seek out the aristocrats of the maple family—and there are many, for the *Acer* clan is large and well rooted throughout a good portion of the country. Indeed, it is in Oregon, far removed from the sugar orchards of New England, that the largest known maple has been discovered. It is a giant bigleaf maple, boasting a circumference two and a half feet above the ground of twenty-eight feet, and a limb spread of nearly seventy feet. According to Oliver V. Matthews, of Salem, Oregon, who discovered and reported the giant, it is located in Lane County, on the south side of the McKenzie River about six miles above Hendricks Bridge, on the McKenzie River Highway.

But a great silver maple at Harbor, Maine, is a close runner-up. This magnificent tree has a circumference four and a half feet above the ground of twenty-two feet, ten inches. It is ninety feet tall and has an amazing limb spread of 110 feet. According to John D. Kendig of Manheim, Pennsylvania, who reported this tree to The American Forestry Association, it stands near the Herbert Hurd farmhouse along the main road at Harbor, which is approximately twenty miles north of Fryeburg. There are other large maples in this location, and the whole group is known as the "Intervale Maples" — but let Mary Carpenter Kelley, of Alfred, Maine, tell about these. She knows them well.

"The intervales of the Bearcamp and Saco rivers are only a few miles apart, though divided by the line that separates Maine from New Hampshire," she writes. "These broad intervales, flooded each spring by their respective rivers, are kept so rich and so moist that the trees that have escaped the ax, the hurricane and lightning down through the centuries are of gigantic size. The 'Intervale Maples,' as local people call their great trees, are by far the most interesting in the region. I have counted from twenty to twenty-five enormous specimens in this group, but none so large as the great tree growing in the yard of Herbert Hurd.

"No doubt this giant, in its youth, saw red men gather and disperse until there were no more red men — for the Pequawket, Sokokis and Ossipee Indians used to tie up their canoes after fishing expeditions at a point nearby. It saw white men come and build houses where the wigwams once stood; and it saw, a hundred years ago, the building of a blacksmith shop on the river's edge—the shop which it shelters today with its wide-spreading boughs. And every year up to a half century ago, the Hurds will tell you, it gave freely of its sap each spring—a barrel a day of sweet, pale sap that made good syrup, though not so light-colored as that of the sugar maple. But now the tree seems too much a monument, too ancient and dignified, to be asked to give its life-blood."

There is another king on the Bearcamp intervale in the town of Ossipee, New Hampshire, thirty miles southwest of Fryeburg, writes Mrs. Kelley. This is a great white pine, estimated to be 500 years old. "Its circumference at the height of a man's arm is slightly over twenty-one feet," she says. "Many of the roots that lie on the surface have achieved bark as thick as that on the trunk. It is enormously tall, perfectly straight and without branches for a great distance."



This great old silver maple at Harbor, Maine, is king of its clan

But back to the maples, the largest sugar maple yet reported is on the W. F. Wilbur farm near North Kingsville, Ohio. Known as the "Ashtabula Maple," this giant was recorded by Andrew Carpenter of Ashtabula, Ohio, who writes: "If you will stop your car on U. S. Route 20, just five miles east of Ashtabula, you will see not only this giant maple, but also a magnificent beech. The maple has a circumference of sixteen feet, ten inches, is approximately eighty feet high, and has a limb spread of more than eighty feet. The beech is not so large, its circumference being eleven feet, six inches, its height sixty feet, and its limb spread eighty-five feet. Both trees are estimated to be over 300 years old."

The largest red maple discovered is on the property of Elmer Wannerstrom of Portland, Connecticut — a mighty tree eighteen feet, three inches in circumference four and a half feet above the ground, with a height of eighty-two feet and a limb spread of seventy-seven feet. Kendall Laughlin of Chicago, has discovered a black maple in Turkey Run State Park, Indiana, nine feet one inch in circumference. One of the most unique discoveries is a vine maple, three and a half feet in circumference, near Seaside, Oregon, by Oliver V. Matthews.

While all of these great maples have been discovered by good citizens cooperating with The American Forestry Association in its search for the largest specimens of native American trees, it may be of interest to look back on a different kind of tree quest of a decade ago—the search for the tree immortalized by John Fox, Jr., in his novel *The Trail of the Lonesome Pine*. This is brought to mind by a letter received early in March from a reader who wanted to know "if the Lonesome Pine really existed and, if so, is it still standing?"

The same idea, it seems, occurred to George H. Hepting, plant pathologist of the United States Department of Agriculture, back in 1934 and he set out to see for himself. He was encouraged by George Hurd of Washington, D. C., who claimed to have visited the tree twelve years earlier between Norton, Virginia, and Harlan, Kentucky. It stood then, Mr. Hurd reported, on the Virginia-Kentucky border about 300 yards from the headwater springs of the Cumberland River. It was a hundred feet high and approximately ten feet in circumference. He believed it to be dying.

Armed with this and other information, Mr. Hepting set out on his quest. Here are a few notes from his report: "Talked with filling station operator at Big Stone Gap who informed me there was some difference of opinion as 'to which is the Lonesome Pine. Some say it is on Black Mountain; others say it is somewhere else. Better see Miss Minnie Fox, sister of the man who wrote the book. She lives just up the street.'

"Miss Fox is away. Talked with negro at her home, who declared: 'There really ain't no such tree. They tried to get Mr. Fox to show them the tree, but he died before he got there.'

"A photographer who exhibited a picture of the tree 'taken twenty years ago,' and who knew Mr. Fox, said it 'was right on the state line and can't be seen very far because there are trees around it. Mr. Wax, in Norton, knows how to get to it.'

"Mr. Wax reported that shortly after the novel was published 'we went to look at the tree but found several in the vicinity which fitted the description. John (Fox) later told me that the tree was close to a bear cave where he and some friends took shelter during a storm. The tree is located in Flat Gap which is a divide separating the sources of the Powell and Cumberland rivers. It is now dead and, I understand, has fallen down. Mr. Bolling in Flat Gap knows where it is.'

"Mr. Bolling reported that 'the tree is about two miles' walk from here but it fell down about a year ago.'

"The tree described is probably the original Lonesome Pine, though it is certainly not on a trail from Norton to Harlan. Many people mentioned a 'Lonesome Pine' between Appalachia and Lynch, but none of them could direct me to it."

Did the Lonesome Pine really exist? —and is it still standing? The reader must draw his own conclusions.

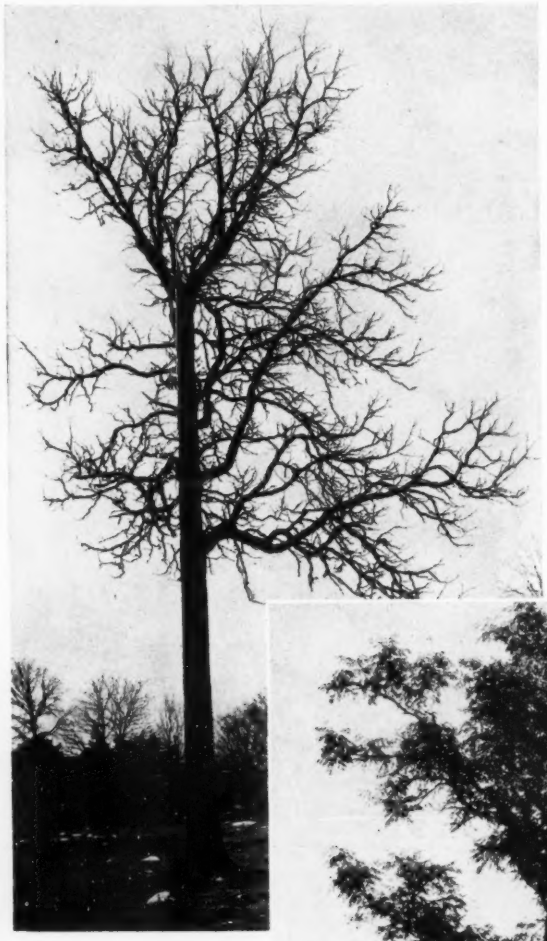
Largest sugar maple is this giant near North Kingsfield, Ohio

KENTUCKY COFFEETREE

***Gymnocladus dioicus*, (Linnaeus) Koch**

By G. H. COLLINGWOOD

THE Kentucky coffeetree is the sole North American representative of the genus *Gymnocladus*. The only other species is in southern China.



The thick, blunt-tipped twigs are a characteristic of the winter tree

Heavy, ascending branches form a high, narrow, irregularly rounded crown

From southern Ontario and western New York to Minnesota and eastern Nebraska, southward through eastern Oklahoma to northwestern Oklahoma and on rich bottomlands within the Appalachian Mountains to middle Tennessee, the coffeetree grows as a solitary specimen or, rarely, in groups.

It reaches heights of one hundred and ten feet and five feet in diameter, but more usually is forty to eighty feet high with diameters of two to three feet. Open grown trunks may be ten to twelve feet tall, with three or four heavy ascending branches turning slightly outward to form a high, narrow and irregularly round crown. Under forest conditions, trunks may be clear for seventy feet.

Gymnocladus, meaning "naked branch" is of Greek origin. The leaves break out late in the spring and drop early in the fall. During six months or more the tree shows no signs of life so that the French of southern Canada refer to it as "Chicot," or "dead tree," and the Southern mountaineers as "stump tree."

The minute leaf buds are hidden in hairy cavities of the bark or in the notches of the heart-shaped leaf scars. The large doubly compound leaf is one to three feet long and often two feet wide, with five to nine pinnately compound secondary leaves branching from the main stem. Each of some forty to sixty small, smooth-margined, abruptly pointed leaflets are two to two and one-half inches long and arranged opposite one another on a central stem. The secondary leaf stalks often occur in pairs but seldom in direct opposition. The large leaves, taken as units, grow alternately along the twigs. Their stalks are thickened at the base, while the first or second basal pair of leaflets are usually slightly lobed, and somewhat larger than the others. They are lustrous on the upper side and pale beneath. In early autumn the individual compound leaflets turn clear yellow and drop separately.

For a week or ten days in June, clusters of green-

ish purple flowers hang inconspicuously among the new leaves. Male and female flowers occur on separate trees, to which the specific name *dioicus* refers. This is derived from Greek words meaning "two-houses." The pollen-bearing clusters are three to four inches long, while the pistillate or seed-producers are six to twelve inches long and slightly hairy.

Belonging to the family *Leguminosae,* coffeetree is a pod-bearer after the manner of the bean and pea. The purplish brown fruit is one of the largest tree pods of this continent, being six to ten inches long, one to two inches broad, thick and full. They mature in one season and often persist, dry and rattling, into the winter. Each pod encloses six or more hard, round, flat, dark reddish brown seeds about three-quarters of an inch in diameter separated by a thick, dark colored layer of inedible, sticky pulp. The name coffeetree recalls efforts of early settlers to use the heavy bitter seeds as a source of a coffee-like beverage.

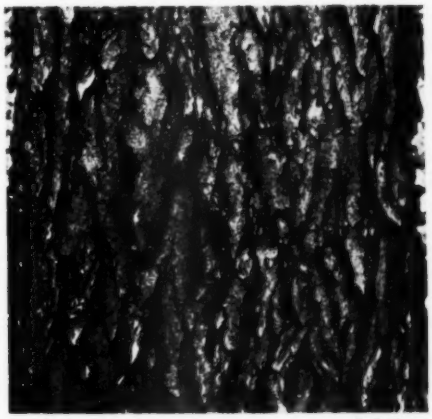
The rough, deeply fissured bark is three-quarters to one inch thick and varies from dark gray to brown. A reddish inner bark may often be seen at the bottom of the longitudinal furrows, which are separated by sharp, scaly ridges.

The light red to reddish brown wood is coarse grained, medium hard and a cubic foot weighs about forty-three pounds when air dry. It polishes well, is durable in contact with the soil, and is used locally for railroad ties, fence posts, poles, and construction material. Too sparsely distributed to be considered commercially important, the lumber is usually sold in combination with miscellaneous hardwoods.

Leaves are three to four feet long with forty to sixty leaflets, are lustrous above, and the flat pods contain six or more seeds

From "Some American Trees," courtesy Macmillan Co.

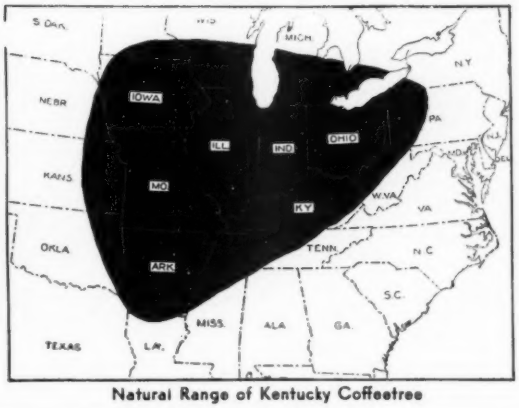
The dark gray or brown bark is deeply fissured, and is three quarters to one inch thick and often reveals traces of reddish inner bark



R. R. Paton

George J. Baetzhold

Pistillate flowers occur on long pedicels, and, like the staminate ones, are greenish purple. The two sexes are borne on separate trees



Natural Range of Kentucky Coffeetree

Southern Pine vs. Northwest Fir

(*From page* 170)

markable, considering past neglect, how industrial concerns, individual landowners, and the public have become attracted to the potential value of lands where young pines are growing. Millions of acres one or more times cut-over have been purchased in a wave of private buying in the last decade. And the war with its emphasis on wood and its possibilities as a raw material has intensified the wave. People are awakening, too, to the fact that with proper treatments timber yields will be increased. All over the southern pine region, among all types of ownership, from thousands of nuclei, conscious timber management is spreading. Unquestionably, the average yield per acre will climb.

As for the fir region, such intensive development is not so apparent, despite its higher potentialities for sheer growth. Perhaps there is still too much virgin or old growth timber to make cut-over land attractive as a timber growing investment. It is true that in the fir forests an increasing number of companies are cutting for sustained yield and are trying to maintain cut-over lands for later harvests, but their example is offset by the thousands of acres thrown back on the counties. Already state laws of the Northwest regulate forestry more than anywhere else in America, and increasingly the thought is that the future of this great timber reservoir depends vitally on large-scale public partnership. National forests already include one-third of the fir region.

Douglas fir has outstripped southern pine in exports to the big northern markets, and has the native capacity to grow more timber. But will it? Four factors are important in the answer: Fire risk, management systems, operating costs and markets.

Beginning with the first: while the South has ten times as many forest fires, the western fires are many times more devastating and a much greater threat to timber growing. Fires can be controlled in the South whenever a real effort is put forth. Probably any one of the big timbered western states spends more money for fire work than the entire southern pine region.

As regards management systems, selective cutting seems to be the accepted procedure in southern pine. Where it will work, selective cutting is generally considered an ideal plan. One hears of this plan in the Douglas fir region, too, but many foresters think this "high grading" for the valuable trees produces a poorer forest. Clear-cutting of small sections in a staggered fashion seems to be the most approved system for Douglas fir. This has expensive features. So does any other management system in Douglas fir. The approved practices in southern pine appear to raise the cost of operation very little.

Thirdly, logging costs in general are much higher in the Northwest than in the South, due to rugged topography and heavy timber. Labor costs are lower in the South, but if labor came higher, operators would mechanize more and save in costs.

Some would be willing to put all the lumber troubles of the Northwest in one package and label it "markets." The fact is, ninety per cent of our population lives east of the Great Plains. The Northwest is 2,500 or more miles from the centers of lumber consumption. The southern pine area is mostly less than 1,000 miles from these centers and well situated as respects rail, boat, or even truck shipping. Besides, the South is rapidly climbing in population and industry, and more important still, from a lumber-use angle, in standards of living.

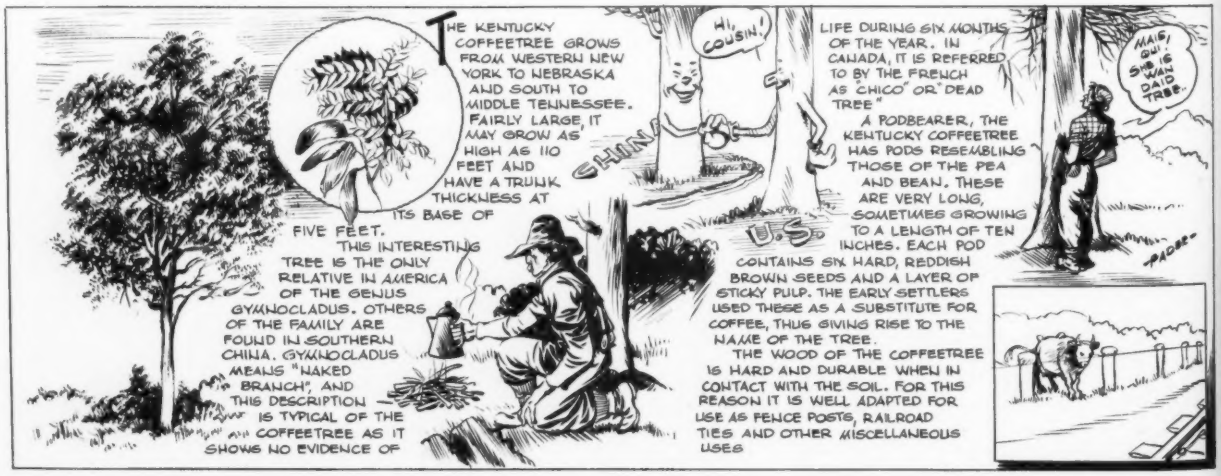
These four factors—fire, cutting system, costs, and markets—all operate more favorably for the southern forest than for the western. The upshot of it all is that it is still hard to predict which of the two forests will actually achieve the greatest yield per acre. Douglas fir has the higher potential, but is at a disadvantage when it comes to applying the intensive cultural practices necessary to approach it.

But the figures do make one thing appear certain. The two regions are capable of growing a tremendous amount of timber. The capacity of one is given as 575 board feet an acre, for the other 360 board feet. Multiplying by the acreages involved produces a yearly growth of 15,000,000,000 feet for the fir forest and 41,000,000,000 for southern pine—a total of 56,000,000,000 feet of lumber. Can it be that intensive forestry in these and other forest regions will lead to an eventual overproduction, necessitating "crop reduction" or "plowing under" programs for timber, so to speak?

During the past decade we have been acutely conscious of surpluses of agricultural products as well as certain other resources. But generally speaking, except where isolation has made transportation costs a hold-back, good commercial timber has not gone begging. It is difficult to visualize big surpluses of wood accumulating. One good reason is

(*Turn to page* 188)

TREES AND THEIR USES—No. 74—KENTUCKY COFFEETREE


THE KENTUCKY COFFEETREE GROWS FROM WESTERN NEW YORK TO NEBRASKA AND SOUTH TO MIDDLE TENNESSEE. FAIRLY LARGE, IT MAY GROW AS HIGH AS 110 FEET AND HAVE A TRUNK THICKNESS AT ITS BASE OF FIVE FEET. THIS INTERESTING TREE IS THE ONLY RELATIVE IN AMERICA OF THE GENUS GYMNOCLADUS. OTHERS OF THE FAMILY ARE FOUND IN SOUTHERN CHINA. GYMNOCLADUS MEANS "NAKED BRANCH", AND THIS DESCRIPTION IS TYPICAL OF THE COFFEETREE AS IT SHOWS NO EVIDENCE OF
HI, COUSIN!
CHINK
LIFE DURING SIX MONTHS OF THE YEAR. IN CANADA, IT IS REFERRED TO BY THE FRENCH AS "CHICO" OR "DEAD TREE"
A PODBEARER, THE KENTUCKY COFFEETREE HAS PODS RESEMBLING THOSE OF THE PEA AND BEAN. THESE ARE VERY LONG, SOMETIMES GROWING TO A LENGTH OF TEN INCHES. EACH POD CONTAINS SIX HARD, REDDISH BROWN SEEDS AND A LAYER OF STICKY PULP. THE EARLY SETTLERS USED THESE AS A SUBSTITUTE FOR COFFEE, THUS GIVING RISE TO THE NAME OF THE TREE.
THE WOOD OF THE COFFEETREE IS HARD AND DURABLE WHEN IN CONTACT WITH THE SOIL. FOR THIS REASON IT IS WELL ADAPTED FOR USE AS FENCE POSTS, RAILROAD TIES AND OTHER MISCELLANEOUS USES
U.S
MAIS, OUI! SOME SWAMP OAK TREE.
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THE NEW FIRE CRUSADE

By DAVID P. GODWIN and ALAN MACDONALD

As every forester charged with keeping down forest fires this year knows to his vocational harassment, the Civilian Conservation Corps, which for the past nine years has been the backbone of our forest fire suppression force, is no more. Also, the skidroads of Portland and Seattle and similar pools of peacetime unemployed workers, from which hundreds of men were rushed to the woods when great fires raged, are bereft of idle hands. On top of that, the Selective Service Act and the fat pay envelopes of the war industries continue to drain manpower from the forest regions. From where, then, is to come the army of fire fighters to beat down this year's raids of the Red Menace?

Back before forest fire lookouts were invented, and to a great extent for long afterward, the key men of the protective systems were the outstanding settlers—the "local cooperators"—of the valleys and plains in or near the forests. Even up to 1934, and the steady development of the established forest protective agencies, both state and federal, the timber and sawmill folk, the ranchers and the local people were a main strength and reliance of the established agencies. In 1934 the CCC came on the forest scene and took over, so to speak, from then until its final elimination in July, 1942. That is to say, the local cooperators lost importance; naturally and progressively, they tended to leave fire fighting "to the boys." Today, unless judgment of years and experience is unaccountably awry, the local cooperators—if you like, the people of the United States—are rising to take back their pioneer responsibility in emergency. This year, in greater numbers than ever before, cooperators will drop their tools, pens and even sometimes brooms at the ranger's call of "Fire!"

In any event, that seems the principal trend that marks this year's forest fire army. Rough estimates of the number of cooperators for the past few years give a good idea of this trend. In 1940, for instance, the protective agencies could count on about 10,000 cooperators. Last year, after the CCC was liquidated, there were perhaps 50,000. This year, with the Forest Fire Fighters Service in operation, the number will doubtless run above 200,000. In a nutshell, the FFFS is a forest arm of the Office of Civilian Defense. Basically, it is an effort to mold into a nation-wide forest fire defense system all of the local cooperator groups scattered through the country, and to build them up into a national organization with high morale and trained effectiveness. Local organization is being carried out through county coordinators, selected for their skill in enlisting the interest of local people. These coordinators solicit FFFS volunteers, attend to their registration, their training for fighting fires, and when they are qualified certify them to the OCD and see that they receive the card and arm-band of membership. From then on, these patriots are on call, like any volunteer fireman or policeman.

Throughout the country, this program has met with a remarkable interest and response. The fact that but two enemy air attempts to fire American forests with bombs have been made has not lulled people into any feeling that, after all, "it can't happen here." On the contrary, the grim realization grows that scarcity of forest bombing or sabotage up to now may be part of a deliberate enemy plan, and that when the time is ripe, the enemy may launch an all-out surprise attack that might prove a holocaust of burning forests, war plants, camps and homes.

This growing army of fire fighters, particularly the volunteer division, includes such contrasts in humanity as ministers of the gospel and inmates of prisons, bankers and handy men, merchants and clerks, housewives and office girls, lumberjacks and professors, conscientious objectors and sixteen-year-old boys.

Last year, in Missoula, Montana, eight preachers volunteered to fight forest fires. "We can't on Sunday," they told the ranger-coordinator, "but we can and will on week-days." The record shows they did a fine job and, it appears, there will be many more ministers fighting this year's fires. Similarly, local sportsmen's groups, gun clubs, veterans' groups and social organizations volunteered en masse, and are repeating this year as well. Groups of able-bodied men and women, in some instances almost the total able-bodied populace of the community, turned out last year to spend Sunday learning the business of fire fighting. Later, many of these volunteers fought fires and fought them well. The idea of the thing stuck, too, because already this year supervisors and others have received inquiries on "What's to be done this year?" Indeed, some are already in action. On the West Coast, business men are spending their vacations as members of fire control organizations — training as lookouts, as patrolmen, as fire fighters.

Not long ago a letter was received from the president of a small forest industry who wanted to help organize the fire fighting volunteers in his community. His frankly stated object was to minimize the probability that his workers, engaged in war production, would be called from their jobs in case of forest fire. "The truth is," he wrote, "that those not engaged in war work can actually *buy* war production with their labor on forest fires in this region." Talk in a similar vein is often heard among West Coast timber operators, whose workers in the past have frequently had to leave their job and be transported to distant fires. "If you can get other people to fight the fires," one of these said recently, "so my men can keep working, you and they are to all purposes producing wood for war." But the prize story of the kind was that of the young soldier's mother who called on a western forest ranger to say that she wanted to fight fires, "and right up on the front line, mind you."

"I think it's a shame that soldiers have had to be called from their training camps to put out fires," she said. "That doesn't seem to me the way to get this war won. I can swing an ax with most men, and if those Russian women can shoulder rifles and march with their men, I guess I can eat smoke here in this forest where I've lived all my life."

Nor is this spirit confined to the West Coast, where the bulk of the commercial forests are and where perhaps the threat of enemy fire bombs seems more imminent. Donald M. Rochester, forester formerly employed in the Lake States and now with the United States Forest Service, returned recently from a trip to several states along the north and mid-Atlantic coast. Having spent several years training persons to fight forest fires, Rochester is lending a hand where desired to state and local authorities in this field, conferring with local officials and fire wardens, training college and school volunteers and groups of key men and women so they in turn can train others. He had been down the coast from Maine to Maryland.

He was impressed, he said, with the fact that "we are getting many good, solid citizens to volunteer this year—property owners of forty-five and fifty, responsible and competent." He contrasted these men, to our present-day advantage, with the idlers and unemployed he had often seen hauled from the city employment agencies to the

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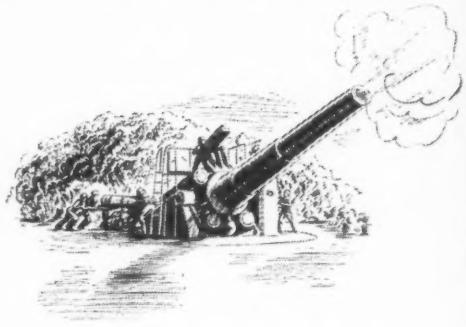

IN addition to pioneering the south for pulpwood thirty-five years ago, Champion enhanced the value of its timberlands by devising the method of making fine white pulp from southern pine, by following all accepted formulae for scientific cutting, and by replanting cutover areas. Thus Champion has contributed to America's independence of foreign sources of pulp supply, and to conservation of materials which in today's emergency supply a sizable share of all pulp and paper needs for war. These products include pulp for explosives, paper for protecting and transporting food and munitions, military instruction books and other government printing, war maps, blackout paper, and substitutes for many critical metal goods. Thus Champion's foresight in reforestation and research today helps win the war for America.

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scene of fire. He told of one stalwart fifty-five-year-old farmer who last year employed twenty men on his farm, but who this year is unable to get help and is striving to keep the place going with the aid of his son. This man, said Rochester, promptly agreed to do his part against forest fire.

The monumental job of training these volunteers is being done by foresters and their experienced fire guards and employees.

To give one example, around 25,000 persons received actual training in how to fight forest fire in the states of Washington and Oregon last year. And perhaps almost as many again will have to be trained this year because a big percentage of last year's trainees are now in the armed forces or have left their former homes for some other wartime exigency.

Filled with human interest as is the volunteer cooperator's story, the wartime importance of volunteer help comes into sharper focus against the background of the 1943 manpower problem which faces the regular forest protective agencies. There is a severe shortage of trained, full-time fire fighting personnel for the regular forestry forces. The draft and war industries have cut deep into the ranks of the woodsmen who in past seasons worked for the services and agencies as regularly employed fire guards, lookouts, smokechasers, camp bosses and the like. With the ever present threat of sabotage fires, and with wartime lumbering, army operations and other unusual activity in the woods, there are few indeed who do not feel that unless manpower miracles are performed what remains of the one-time regular force of experienced fire guards and crews is going to be spread too thin for any feeling of security.

There is promise, however, in what is being done. Deans of colleges and forestry school faculties, as well as high school heads, have joined the recruiting campaign with their traditional understanding and interest. In Washington, there has been set up for the first time a kind of central recruiting office. This office will strive to recruit youngsters for a central pool from which they will be apportioned to the northwest regions. How many eastern lads will be in position—or of mind—in these wartime days to spend a summer fire season in the camps, working on blister rust control projects, road and trail and landing field maintenance or other projects, and always on call for fire duty, is still a problem. But every effort is being made to acquaint prospective recruits not only with the personal benefit they can derive from a summer in the forests but also how much this service means, just now, to their country.

There remain two other sources of manpower which proved of real value on a small scale last year, and which can, fortunately, be expanded this year—that is, prison inmates and men in the Civilian Public Service, or conscientious objector camps.

Three camps of prison inmates were established in the San Bernardino and Cleveland national forests in California last fire season, and so far as fighting fire and doing forestry jobs are concerned, the prisoners proved to be good men. They obviously valued the chance to be in the forest; and if some may have dreamed of heroic exploits that might win parole, why, so much the better. This year California plans to have thirty-two such camps with 750 prison fire fighters under agreement with the State Board of Prisons. Through the Federal Board of Prisons, arrangements also have been made so that inmates of federal prison camps at Tallahassee, Florida, Tucson, Arizona, and Kooskia, Idaho, and of the federal prison at Mill Point, West Virginia, can leave their cells under guard to fight forest fires.

Conscientious objectors who last year were sent to camps in the western forests and fought forest fires, in addition to other forestry jobs, went far, where they were employed, to fill the hole left by the CCC. But there just were not enough of them. It is expected that there will be more in the woods this season.

Roy Headley, former chief of fire control, United States Forest Service, used to worry about "too much dependence on the CCC, because some day we won't have the CCC." Endowed as it proved with prophecy, he often added, "crusaders are waiting — if we can only arouse them." Well, it seems the war has aroused them by the tens of thousands. And considering the fire fighting personnel problem of the established protective agencies, it is high time.

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AMERICA'S GARDEN BOOK, by Louise Bush-Brown and James Bush-Brown. Published by Charles Scribner's Sons, New York. Illustrated, 1,222 pages. Price $3.50.

In writing "America's Garden Book" the authors have attempted to meet the needs of urban, suburban, and real country dwellers for accurate information on all phases of gardening. This book is not confined to the making of flower and vegetable gardens, but includes the latest and most approved methods and practices of gardening activities in the fullest sense of the word.

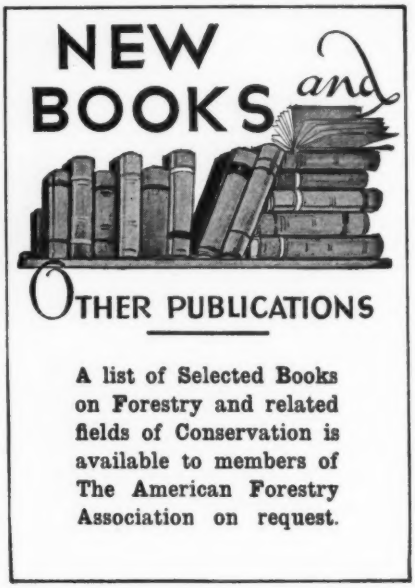
This great volume contains thirty-four chapters of well-written information on such subjects as soil improvement; landscape designs; construction problems; care of lawns; planting of vines, trees, shrubs, hedges, annuals, biennials, herbaceous perennials, bulbs, lilies and roses; rock, woodland, water and herb gardens, including city gardens and flower pot gardens; greenhouses; coldframes and hotbeds; house plants; culture of plants in nutrient solutions; fruit and vegetable gardens; general gardening practices, tools and garden equipment; propagation methods; and diseases and insect pests which attack plant materials. The volume is replete with a garden calendar, maps of growing conditions and frost dates, glossary, and index.

WILD ANIMALS OF THE ROCKIES, by William Marshall Rush. Published by Harper & Brothers, New York. 296 pages, illustrated. Price, $3.00.

The author, for many years a keen observer of wildlife, here relates his experiences—with bears, whom he believes to be the wisest of all American wild animals; with deer, elk, moose, antelope, buffalo, mountain sheep and mountain goat. It is a chronicle informed by intimate first-hand knowledge, rich in the lore of wilderness life and lighted by remarkably detailed observation. As a forest ranger, forest supervisor and game specialist, the author knows the wildlife of the western country. What he writes about it is intensely interesting and refreshing.

THE FOUNDATIONS OF CONSERVATION EDUCATION, 1941, Pamphlet No. 3, by Committee on Conservation Education of the National Wildlife Federation. Published by the National Wildlife Federation, Washington, D. C. Illustrated. 242 pages. Price, $1.00, buckram; paper, 60c.

Written to provide teachers with a clear understanding of the principles of conservation, this book is the work of six men whose names give it special interest and authority. The writers are Wesley C. Mitchell, former president of the American Association for the Advancement of Science, Dr. W. C. Lowermilk of the Soil Conservation Service, Paul B. Sears of Oberlin College, Arthur N. Pack of the Charles Lathrop Pack Forestry Foundation, W. W. Horner and Richard W. Horner, the former of the National Resources Planning Board and the latter Public Relations Representative of the American Telephone and Telegraph Company, and Dr. Henry B. Ward, Emeritus Professor of Zoology, University of Illinois. The authors have dealt with various phases of conservation from their own point of view and have prepared their chapters independently of one another. The result is a series of articles at once instructive, refreshing and thought-provoking—a volume that should be highly helpful and stimulating to teachers and students and to all persons interested in getting at some of the fundamental principles underlying the conservation movement.


NEW
BOOKS and
OTHER PUBLICATIONS
A list of Selected Books on Forestry and related fields of Conservation is available to members of The American Forestry Association on request.

HANDBOOK OF AMERICAN MOUNTAINEERING, by Kenneth A. Henderson. Published by Houghton Mifflin Company, Boston. 239 pages, illustrated. Price, $2.75.

This is the American Alpine Club's handbook, the first to deal specifically with American mountains and American conditions. It is simple and clear enough for the beginner, comprehensive enough for the expert. It has chapters on rock terrain, ice and snow terrain, dangers and rescues, camping, cooking, equipment, map reading, the use of compass, weather, sledging, photography and the use of the airplane. An enlightening and valuable book, especially designed for field use.

TRY GROWING HERBS, compiled by Helen M. Whitman for the New York Herb Society of America. The Tool Shed Press, Bedford, N. Y. Price, $1.00.

The art of growing and using effectively a wide variety of culinary herbs—age-old in Europe and one of the secrets of skilled continental cooks—is a newer art in America. To help stimulate its development, and because the global war has cut off many importations of herbal materials, this little handbook for experimenters in this field was prepared. Forty-seven herbs are listed, largely former imports, the future of which is now uncertain. And a valuable feature of the book is that the opposite page, facing the concise information listed on the individual herb, is in blank, to hold the record of the experimenter.

INFORMATION, by Jane MacDonald. Published by Tourservice, New York. 96 pages, illustrated. Price, $1.50 popular edition, $2.75 de luxe edition.

A streamlined recreation guide to Washington, D. C., and environs in Virginia, Maryland and Delaware. Scenic and historic spots; golf courses; picnic groves; hospitals; airports; churches; department stores—everything visitors as well as many natives ask. A valuable guide.

SELECTED PROBLEMS IN THE LAW OF WATER RIGHTS IN THE WEST, by Wells A. Hutchins. 513 pages. Superintendent of Documents, Washington, D. C. Price, $1.00.

This book was prepared under the supervision of the Solicitor of the Department of Agriculture because of the need of the Department for knowledge in this field of the law in the West, in connection with its important work in soil erosion, stabilizing watersheds in flood control and the promotion of soil and water conservation.

LANDSCAPE ARCHITECTURE IN THE MODERN WORLD, by Karl B. Lohman. The Garrard Press, Champaign, Illinois. 165 pages, illustrated. Price, $2.50.

In this book, the author, who is Professor of Landscape Architecture at the University of Illinois, deals broadly with the whole field as affected by modern living conditions, rather than stressing particular aspects, or planting phases. It brings, not only to professionals but to home and estate owners and those charged with state or civic responsibility, facts and information of great value in restoring or planning and establishing the beautiful and practical in natural settings, and reviews clearly the means through which the most effective results may be obtained.

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Wood and Machines

(*From page* 155)

the wooden rods which are to many wood turners what bricks are to masons.

Three-fourths of the mill's employees are women. Machines permit them to do all but the heavy work. "Most of the men in this neighborhood," explains Mr. Cummings, "have been drafted, or are in the shipyards, or are working in the woods." Workers come to the Norway mills from forty miles around. The town's streets are lined solidly with automobiles, each crowded to capacity when it arrives and when it leaves.

Huge trucks rumble into the mill yard loaded with lumber ripped out by portable saws in the woods, or logs still wet from the forest. These go to band saws as tall as a two-story house, to be sliced like cheese into boards from a quarter of an inch to any thickness desired. Little railroad cars each carry ten cords of the boards into kilns, great brick caverns kept so hot that in three days the boards are dried out as much as if they had spent a year in the sun. "Each cord weighs about 6600 pounds when it goes into the kiln and loses 2600 pounds in the three days of drying," says Mr. Cummings. "That's how much water comes out."

In the dowel mill a hundred gleaming machines, each the size of an ordinary automobile, take boards still warm from the kiln at one end, and emit sheaves of wood rods at the other. The machines cost $11,000 apiece; each does the work once done by a dozen men. "Sometimes," says Mr. Cummings with true Yankee caution, "I think they are worth what they cost."

The dowels go to machines where one crew of girls turns them into pup-tent poles, another into tent pegs, another into gadgets used in torpedoes with precision tolerances of .005 of an inch. Another—"But we'd better get out of here," says Mr. Cummings. "We're getting down toward the military secret zone." Other buildings visitors cannot enter at all.

Nine trucks work day and night bringing logs and ripped lumber to the Cummings mill, delivering finished products to the railroad for shipment to Army depots, delivering dowels to other wood-working plants in the town. One of these is the Novelty Turning Company, almost as old as the Cummings concern. "Novelty" turns dowels into a score of items including shoe pegs for plants making footwear for our fighting men, and tongue depressors for the medical corps.

But chiefly this plant makes domestic goods without which few women think they can get along, but for which no metal is now available. In addition to costume jewelry, lipsticks, buttons, and such gadgetry, Novelty makes parts for wooden toys, sporting goods, and the like. Such plants as these will keep many a retail store in business during the war, in addition to supplying needs which are no less necessary to domestic morale because they are esthetic or familiar items of convenience.

In some cases it is hard to draw the line between what are war necessities and what are domestic needs simply because America's standard of living has accustomed us to their use. Take, for example, rubber shoe heels. Obviously, solid rubber heels are out. Wood came to the rescue. Woodworking plants make wooden cores for cushion heels which not only save two-thirds of the rubber but save metal by reducing the number of nails or screws needed to fasten them to the shoe.

Another Norway plant makes skiis and snowshoes, formerly almost altogether for the sporting goods trade. Now these are military supplies. Halfway across the country at St. Paul, two generations of the Gregg family have been making single-trees and started making skiis for sports use when the depression cut farmers' buying power. Now an expanded plant is making nothing but skiis for the Army, precision made to specifications drawn to fit ski troopers classified by height and weight.

Perhaps mass production reaches its spectacular height not in a Detroit jeep factory, but in the box-making plants of the western pine country.

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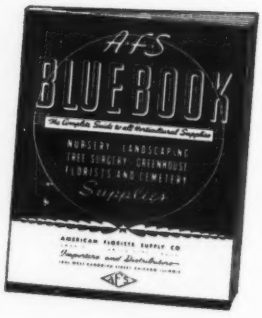

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Remember—this did happen last year. It has been happening every year since man took over the stewardship of the land. It can happen this year unless Americans realize that they can't win with fire—and mobilize against it with conviction and determination.

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feed the nails fast enough; they are forced through the magazines by compressed air, shot into position by pneumatic guns.

Box-nailing machines are thirty years old, but machines which drive four screws at a clip into ammunition boxes are new. Certain boring and slotting machines designed to fashion the elaborate patterns needed to keep small arms solid in their containers and to house such boxes' locking lugs, are developments of this war.

Furniture manufacturers from Jamestown, New York, and Grand Rapids to the Carolinas and Arkansas are making airplane and glider parts—all precision jobs. Others are making parts for Army trucks and Navy boats. Others make parts which replace aluminum in parachute flares; or instead of golf club heads they make dogwood shuttle blocks for textile mills; or instead of animal traps, Army cots and other war goods. The same wood which makes shoe lasts makes machine bearings which outwear metal bearings in many uses. For these precision tolerances must meet "absolute" standards.

As rationing of domestic supplies progresses, demand on wood increases. Powder compacts, frames for the picture of the sweetheart, son, or husband in the service, cigarette cases and holders, ashtrays, similar gadgetry, are only among the more obvious items which already replace other materials. Baking dishes, stirrup pumps, pails, washboards using no metal at all, perambulators, showerbath fixtures, and a long list of other hardware replacements, may be more mundane but are scarcely less necessary. More than a thousand domestic hardware items ranging from hinges to manhole covers and window frames to bedsprings, find wood now replacing metal. Not all of these are machine-tooled, but nearly all of them are mass-produced.

History has a happy knack of justifying sentiment with dramatic happenstance. Precision wood-working to meet war needs can be found in all kinds of plants in all parts of the country, it is true. But its most daring and various expansion is in New England, where American mass production, made possible by development of machine tools, was born with the eighteenth century Yankee wood-worker, modern industry's inventive sire.

In the very neighborhoods where Eli Terry first used the new technique to make wooden clocks and Eli Whitney first applied the same methods to metal, plant after plant that for a century has been making small consumers' goods out of metal, has returned to wood. The wood they use is the second-, third-, even fourth-growth hardwood grown on New England hillsides which first were lumbered off a century or two ago. A cycle has been closed.

No, that is not true. A full turn of an ascending spiral of production method applied to ever replenishable raw supplies has been accomplished, to help win this war and then to help supply the use-needs of peace.

Southern Pine vs. Northwest Fir

(*From page* 178)

the very nature of wood. Being chiefly cellulose, it can be transformed into innumerable things—fibers, motor fuels, plastics, even food. Spurred by war needs, developments now taking place, many believe, are opening a new world for the use of wood.

Another reason is foreign trade. Since they are seaboard forests, both the Douglas fir and southern pine forests have a natural interest there. The Orient, teeming with one-half the population of the globe, is woefully deficient in just the kinds of timber the West can supply, while Latin America and Europe have particular need for timber like southern pine. When the war is over these countries will need great quantities of wood for years of reconstruction. Again, some years from now oil supplies may become scarcer. There is much talk of various fuels to replace gasoline, and the Europeans, having been confronted with this problem, have found wood fuels the next thing to oil and coal.

Finally, the qualifications of a prophet are not required to predict that future years will be quite different from the first thirty-five of this century, when problems of distribution kept people un-

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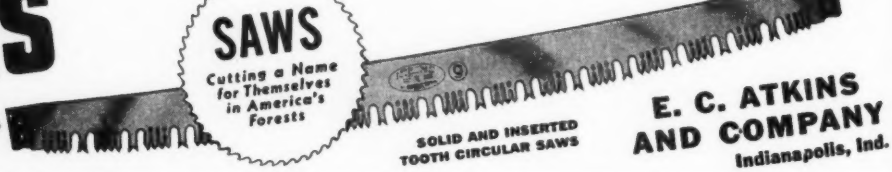

SOLID AND INSERTED TOOTH CIRCULAR SAWS

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dersupplied with many things. To provide good homes for all families that need them would in itself create a tremendous demand for timber. I believe a person completely misreads the signs of the times if he does not foresee a higher-geared economy for America, one that will utilize more of the nation's resources.

Forests constitute a main resource that can be perpetuated, and assuredly we will seek not only to perpetuate, but also to enhance. If in the past years the accent has been on a growing competition between our two leading forests, the accent of the future may well change to one of contribution—with the output of each finding good reception. Such, indeed, is the case now in the defense program. We may not know which will achieve the greatest growth, but we know very definitely that America, in having these two remarkable forest areas, is most fortunately endowed. Were we to discuss quality of the respective woods, the same thought would be strongly underlined, for both are highly desirable, different though they may be in certain points.

Facts About Fur

(*From page* 167)

by the fur traders was, for instance, the word "peltries", which referred to skins merely dried and purchased from the trappers. This word was also used to denote all skins composed of short hairs, among which were such animals as the deer, elk, antelope and buffalo — skins generally converted into leather for making shoes, moccasins, leggings, gloves and coats, most of which were worn as pure leather with all hair removed. The word "fur" applied to skins that were tanned without removing the fur, and which were intended to be used for warmth or adornment.

The long and interesting development of the fur trade in North America is well known. Few, however, are acquainted with the part the fur industry, and a firearm, played in the furtherance of man's knowledge with respect to the human digestive tract. Had it not been for fur and a fur-trading post, and a firearm in the American wilderness, it is possible the twentieth century would have found the medical world still ignorant of the chemistry involved within the abdominal regions of the genus homo.

At the time the American Fur Company was a leading contender in the North American fur trade, it had among its employees a man named Alexis St. Martin. In 1822, while stationed at Michilimackinak, he accidentally shot

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himself with a musket loaded with buckshot. The load tore a hole about the size of the human hand obliquely in the abdominal region; one-half of the sixth rib was destroyed; the fifth rib was fractured; the lower portion of the left lung was lacerated, as well as the diaphragm; and finally the stomach was partially perforated. Domiciled at this fur center at the time was Dr. William Beaumont, then a surgeon in the United States Army. To him fell the seemingly impossible task of saving St. Martin's life. As terrible as this wound was, Dr. Beaumont, with aid from Mother Nature, succeeded in healing St. Martin by June, 1823, approximately one year following the accident. The wound in the side of the stomach, however, never closed, though in time becoming completely healed.

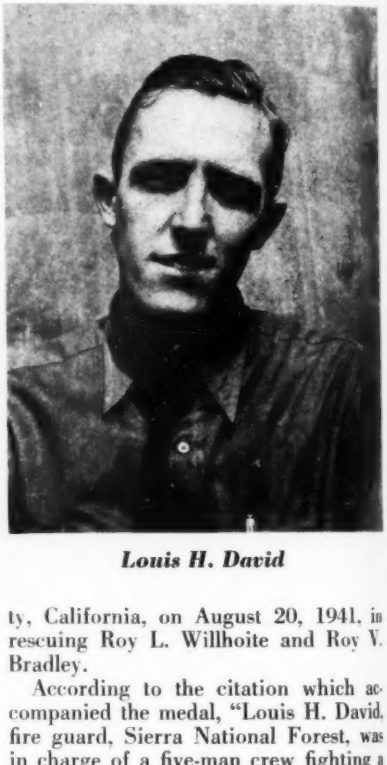
Thus, it is recorded, "the cavity of the stomach" became "open to the view." The "state of its surface, and of the secretions from it" could be "readily examined." Foreign bodies could "be introduced and removed at pleasure," and the changes which were "wrought upon them," at any time after they had "been introduced," could "be ascertained."

For several years St. Martin became a human guinea pig in the furtherance of science under the critical study conducted by Dr. Beaumont. Meticulous observations of the stomach in all its functions and under a variety of conditions were made, — "functions of an organ," heretofore closed to science. The results finally led to the publication of a 280-page volume by Dr. Beaumont under the title "Experiments and Observations on the Gastric Juice, and the Physiology of Digestion," published in 1833. St. Martin, incidentally, enjoyed good health after recovery and had "as much vigor as men in general."

It is said that the vicissitudes of the fur trade in North America produced a hardy, steel-like group of outdoorsmen. One has only to delve into the history of the western "mountain men" to verify this. Alexis St. Martin apparently was of this strong type.

Fire Guard Awarded Medal for Heroism

FOR HIS heroic act in saving the lives of two fire-fighters, Louis H. David, a former United States Forest Service guard in the Sierra National Forest, California, has been awarded the American Forest Fire Medal for Heroism. This award by the American Forest Fire Foundation was the only one made for 1942, and was for heroism displayed at the Cow Creek Fire in Mariposa County, California, on August 20, 1941, in rescuing Roy L. Willhoite and Roy V. Bradley.



Louis H. David

According to the citation which accompanied the medal, "Louis H. David, fire guard, Sierra National Forest, was in charge of a five-man crew fighting a fire in thick grass, brush and scattered pine on the precipitous slopes of Merced River Canyon. David detailed his men to build fire lines while he backfired. Hundreds of feet below, a change of wind suddenly whipped up flames which raced towards them. Ordering his crew

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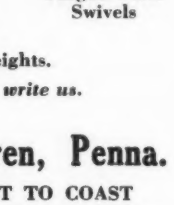
Bull Dog Grabs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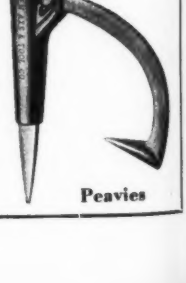
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to safety onto the burned-over area, he started down the fire-line then being swept by flames. Through heavy smoke and fire came a call for help. David dashed through smoke and flames and found Willhoite on hands and knees, delirious, and overcome, while Bradley was clutching at Willhoite's belt, both men near exhaustion, surrounded by flame, and badly burned. David grabbing both men, dragged them fifty feet out of the fire and into the safety of the burned-over area. By his good judgment and quick thinking, Louis H. David safeguarded the lives of his crew and by his outstanding leadership and heroic act, saved the lives of Roy L. Willhoite and Roy V. Bradley."

Willhoite was one week in recovering from his burns, while Bradley was unable to return to his work for thirty-two days. It was the judgment of eye-witnesses that David unquestionably saved their lives.

The medal was presented to David in Northfork, California, where he is now employed. M. A. Benedict, supervisor of the Sierra National Forest, made the presentation, representing the American Forest Fire Foundation.

This is the eighth forest fire heroism medal awarded by the Foundation since its establishment in 1937. Four have been posthumously awarded.

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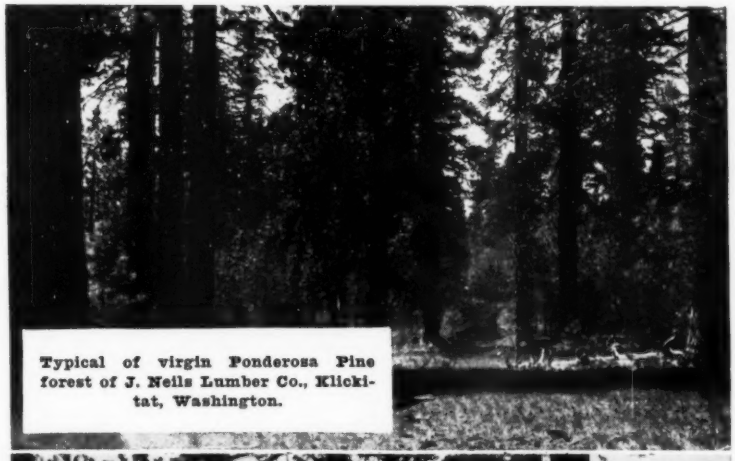

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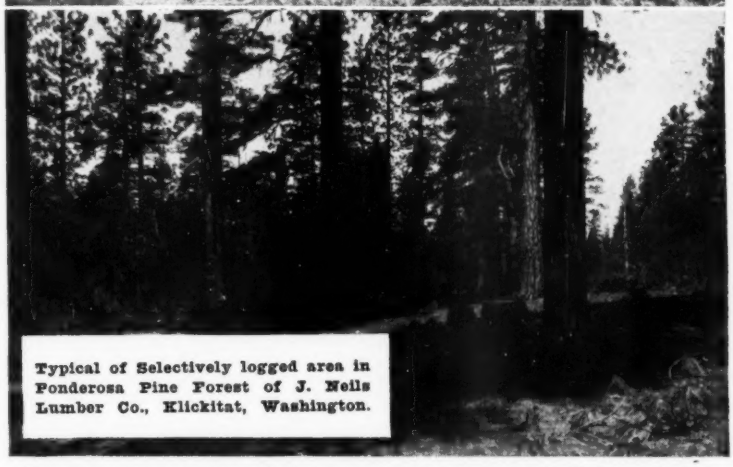

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WHO'S WHO
Among the Authors in this Issue

ELRICK B DAVIS (*Wood and Machines*), writer and lecturer on journalism, has specialized in popularizing technical subjects. He is now attached as feature writer and critic to the Public Relations Staff of American Forest Products Industries, Inc.

ORMAL I. SPRUNGMAN (*Canada's Annual Wildlife Spectacle*)—outdoorsman, conservationist and writer, free-lances from Minnesota. He has fished, hunted and packed all over the Northwest—including the Yukon.

DR. RAPHAEL GONZÁLEZ SOL (*Balsam of El Salvador*), prominent South American educator, is the author of various historic and scientific books. Dr. Sol is as well the Director of *Facetas*, an illustrated review.

RAYMOND A. JANSSEN (*Nature's Studio*), scientist and writer, is a native of Illinois. Interested mainly in geology, botany and paleobotany, Dr. Janssen has written a number of books in these and related fields. A member of the American Association of Museums, Dr. Janssen is active in the work of leading scientific organizations.

T. G. NORRIS and G. W. GEESAMAN (*Dairy Farming With Sawdust*) are both Pennsylvania foresters, attached to the State Department of Forests and Waters. Mr. Geesaman's chief interest is in forest soils and soil fertility, while Mr. Norris—a fisherman at heart—yearns over the beautiful mountain streams, battling pollution—industrial or otherwise (especially sawdust) "because it kills the trout and spoils the fishing."

STANLEY P. YOUNG (*Little Known Facts About Fur*), an experienced explorer, miner and cattle rancher, has always been interested in wildlife. When he took his master's degree in biology from the University of Michigan, he turned predatory animal hunter and entered the Government service. Eventually he was placed in charge of the big game reserves and all control work for the then Biological Survey.

CHARLES ROBERT ROSS (*Southern Pine vs. Douglas Fir*), a tall forester from North Carolina, took his bachelor's degree in forestry from the University of Georgia in 1931 and his master's degree—on a scholarship—from the University of Washington at Seattle the next year. For seven years he served with the U. S. Forest Service in the West and in four Southern states. After two years in South Carolina, he moved to Alabama in 1941, where he is the forester of the State Extension Service.

THE COVER—"Spring Song"—Photograph by Harold M. Lambert.

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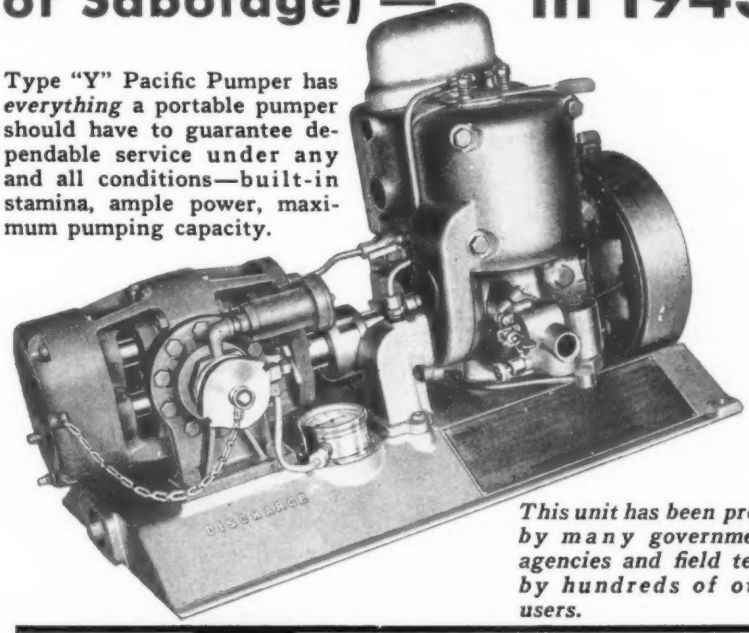

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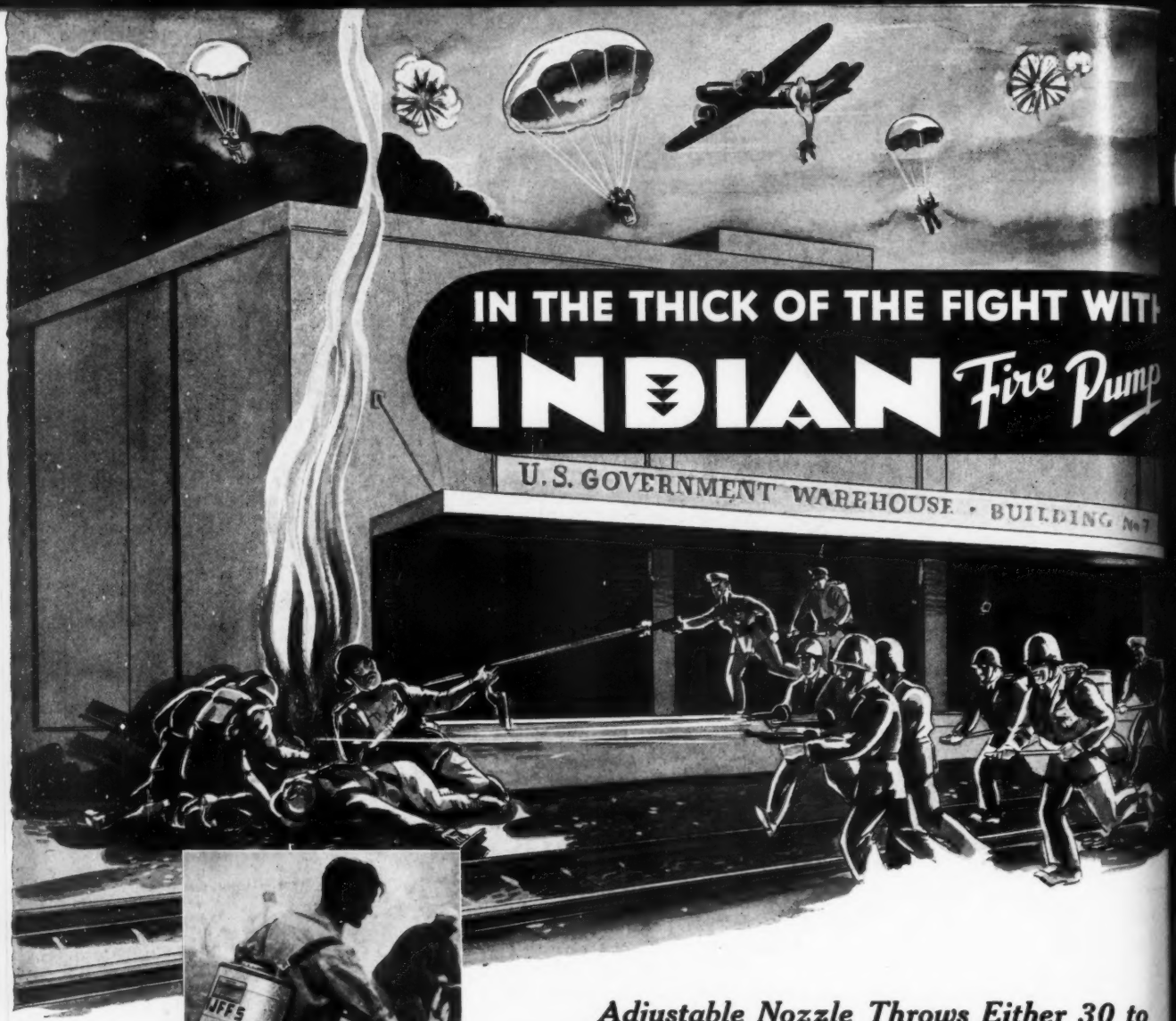

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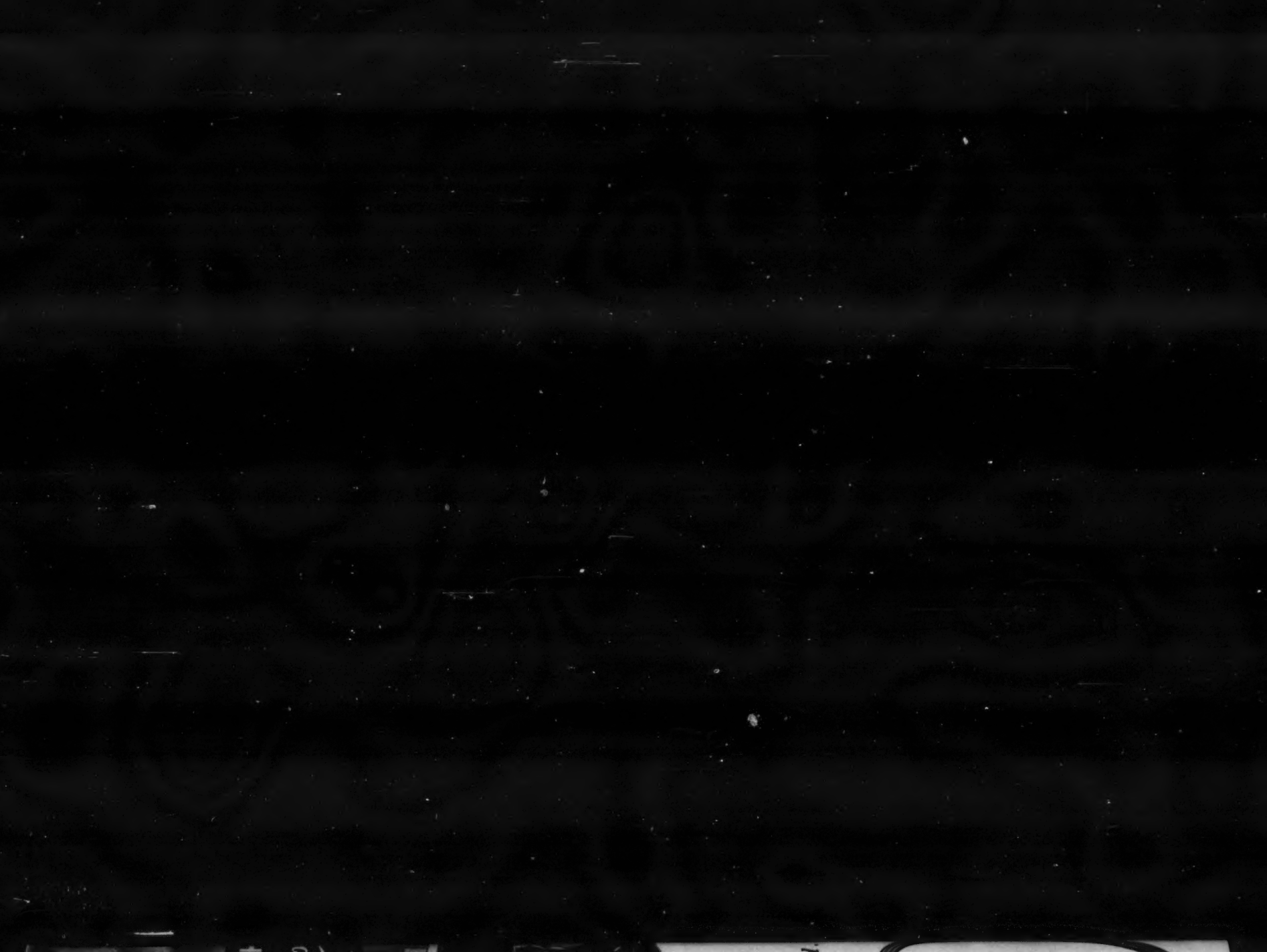
•

NO CHEMICALS

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